

NORTHERN NECK REGIONAL SOLID WASTE MANAGEMENT PLAN



NORTHERN NECK
PLANNING DISTRICT COMMISSION

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Executive Summary

Legislation passed by the Virginia General Assembly requires that all counties, cities, and towns prepare and implement a solid waste management plan in order to achieve a twenty-five percent (25%) reduction in waste by 1995. In response to this mandate, the Counties of Lancaster, Northumberland, Richmond and Westmoreland and the Towns of the Northern Neck have requested that the Northern Neck Planning District Commission develop a Waste Management Plan.

The Counties of the Northern Neck have a population of 45,000 and are very rural in nature. Because of the Counties' sparse population, it is not feasible to provide curbside pick-up for the residents. Greenbox sites are provided in all counties for residents to drop-off their waste. A tri-county landfill was developed for the counties of Lancaster, Northumberland and Richmond; and Westmoreland County developed their own landfill. The Towns, on the other hand, have a more densely populated area. The Towns provide curbside pickup or private haulers pick-up waste and haul the materials directly to the Counties' landfills.

In preparing a long range plan for this region several problems were encountered. First of all, there is no concrete information concerning the amount or type of waste generated. Waste is not weighed, recorded or sorted by type. Secondly, there is the problem of economics. Even though there are numerous benefits associated with the reduction of waste, recycling programs will cost the localities. And last but not least, there is the question of politics. Upcoming elections and possible change of elected officials may create a change in policies. Therefore, a plan was designed taking into account all of these constraints.

According to the Environmental Protection Agency's (EPA) figures, the Northern Neck, as a region, has a population of 44,173 and generates approximately 83,784 cubic yards of waste a year. Projections indicate that population in the year 2000 will be increasing to 47,480 and waste will increase to 16,509 cubic yards.

In March, the Northern Neck Recycling Task Force, a citizens group in Lancaster and Northumberland Counties, performed an evaluation of the amount of waste going into the Tri-County landfill. The results of this survey and estimates from a consultant engineer indicate that EPA's figures on the regions waste are usable as an estimate.

Strategies developed in this plan take into account the long and short term needs of the region. The localities would be ill-advised if they developed a long term plan involving large capital investments when they are faced with the aforementioned constraints. In light of these constraints a plan was developed using short term planning strategies as well as long term

recommendations. The existing waste management system will continue and be evaluated after six months. Based on the results of the evaluations this system will continue or modifications will be made. In order to develop a long range strategy the best waste management options were evaluated and presented with recommendations. Other sections in the plan include special waste needs and an educational component.

Managing and reducing waste is an ongoing process. Reducing the amount of waste that is buried in landfills is a new concept that must be implemented at the local level. It is important to note that waste reduction is a not a plan to be set in stone, but a process that evolves over time and needs to be addressed during the planning stages. The amount of waste that is produced and reduced needs to be evaluated annually to determine if the most cost effective and efficient strategies are being used. This plan was developed with those concepts and will allow counties and towns to modify a system based on its effectiveness.

Definitions

Bale - A process by which materials are compressed into bound bundles to reduce volume.

Bi-metal cans - Cans containing some amount of ferrous material. Also known as "steel" cans.

Cell - In the construction of a sanitary landfill, "cell" refers to an individual pit which is excavated, filled with refuse, and covered. Each cell is an independent system, with its own permits, lining and closure plan.

Closure - The process by which a landfill cell which has been filled with refuse is covered and sealed.

Contamination of recycling materials - The mixing of a "pure" recyclable material with any other material that will complicate the processing of the recyclable material into a new product. For example: organic material in recyclable aluminum, green glass in clear glass, etc.

Curbside pickup - The service of collecting waste directly from the producer, whether it be individual households or commercial establishments.

Dewatered sludge - Sludge which has been dried to reduce the water content.

Dumpsters - Large refuse collection containers which are designed to be dumped directly into trucks.

"Greenbox" - A refuse container which is situated at an unmanned refuse collection site.

HDPE - High density polyethylene. A plastic resin used for packaging. For example, milk containers.

Incineration - The volume reduction of solid waste by combustion.

Landfill - A sanitary landfill.

Landfill seepage - Rainwater or groundwater which, having percolated through the refuse in a landfill, carries contaminants out of the landfill.

"Lemna" treatment system - A process by which liquid waste (normally after primary treatment) is treated by vegetation growing in a shallow pond.

PET - Polyethylene Terephthalate. A plastic resin used for

flexible, clear packaging. For example, 2-liter soft drink containers.

Principal Recyclable Materials - Newspaper, ferrous scrap metal, non-ferrous scrap metal, used motor oil, corrugated cardboard and kraft paper, container glass, aluminum, high grade office paper, tin cans, cloth, automobile bodies, plastic and clean wood, brush, leaves, grass and other arboreal materials. "Principal Recyclable Materials" do not include large diameter tree stumps.

Recycling - The process of separating a given waste material from the waste stream and processing it so that it is used again as a raw material for a product, which may or may not be similar to the original product.

Regional landfill - A sanitary landfill developed to take refuse from more than one municipality.

Resource Recovery - The process of collection, separation, recycling and recovery of energy from solid wastes, including the disposal of non-recoverable residues.

Reuse - The use of a product more than once in its same form for the same purpose.

Rolloff container - A refuse collection container constructed so as to allow for transport of the container on specially designed truck.

Septage - The semi-solid residue left by sewage in a septic tank.

Sludge - The semi-solid residue left after the treatment of sewage in a sewage treatment plant.

Source Reduction - Any action that reduces or eliminates the generation of waste at the source, usually within a process.

Stumps - Large diameter tree stumps and roots, usually the result of land clearing activities.

Tipping fee - A fee, usually dollars per ton, for the unloading or dumping of waste at a landfill, transfer station or recycling center.

"Traditional" recyclables - Materials which have most commonly been targeted in recycling programs. Specifically, glass bottles, bi-metal and aluminum cans, recyclable plastic containers, paper and cardboard.

Transfer station - A permanent facility where waste materials are taken from smaller collection vehicles and placed in larger vehicles for transport.

Waste stream - The total flow of solid waste from homes, businesses, institutions and manufacturing plants.

White goods - Large household appliances.

Yard waste - Leaves, grass clippings, prunings, and other natural organic matter from yards and gardens.

Section I

Introduction

The Virginia Area Development Act of 1968 established the existing system of regional planning district commissions in the State. There are twenty-one such planning districts in Virginia, and each district contains local jurisdictions united by many common physical, cultural, and economic ties.

The Northern Neck Planning District Commission was established in 1969 pursuant to the Virginia Area Development Act and is charged with the responsibility for regional planning and coordination of governmental programs within its territory. This territory includes the counties of Lancaster, Northumberland, Richmond, and Westmoreland as well as the towns of Colonial Beach, Irvington, Kilmarnock, Montross, Warsaw, and Whitestone. The Commission has been designated by the Department of Waste Management of the State of Virginia to prepare a regional solid waste management plan for these jurisdictions. Thus, with the support of local government officials, the commission has sought to initiate a solid waste management process.

Modern solid waste management has become an extremely complex problem for municipalities throughout the United States. Local government officials have the responsibility of seeing that wastes which are generated within their jurisdictions are collected, handled, and disposed of properly. Officials must also blend federal and state regulations and guidelines governing these functions, with citizens, businesses, and industries which require or demand certain levels of service. In addition, there are a number of complex technological and operational options to consider in the safe and efficient management of solid wastes. Further complicating the situation is the fact that the amount of solid waste produced continues to grow in response to increases in population, personal consumption, and the amount of over-packaged and disposable items produced by manufacturers throughout the world. These and many other factors are contributing to the complexity of modern local solid waste management.

The Northern Neck Planning District Commission and its member localities have been faced with a number of potentially severe waste management problems, some of which relate specifically to the rural characteristics of the region. These include: the storage and disposal of hazardous chemicals (from both agricultural and small quantity generators); the imminent closure of the tri-county landfill and alternative site selection; the automobile tire disposal problem; waste collection in a sparsely settled rural area; and the collection and marketing of recyclables.

The impacts of waste on groundwater, soils, the Chesapeake Bay, agricultural land, wildlife, wetlands, and the overall beauty of the Northern Neck have become an increasing problem over the past few years as have the costs associated with disposal and collection. Local officials and citizens of our area have realized that waste management is a problem that must be dealt with at a local and regional level.

The Planning District Commission understands that waste management is an ongoing process that evolves over time and must be reviewed on a regular basis. There is a need to analyze the impact of our solid waste management system and examine the newest strategies to determine if those strategies would be useful in our system. This plan is an update of the 1989 Northern Neck Planning District Commission Regional Waste Management Plan and will examine all available alternatives for waste management in the Northern Neck and make recommendations for collection and disposal systems that should be used.

Section II

Characteristics of the Northern Neck

Study Area Description

The Northern Neck of Virginia is the name given to a narrow peninsula in the northeastern part of the state, bounded by the Potomac River to the northeast, King George County to the northwest, the Rappahannock River to the south, and the Chesapeake Bay to the east (see Map xx).

The Northern Neck includes the four counties of Lancaster, Northumberland, Richmond, and Westmoreland, as well as the towns of Colonial Beach, Irvington, Kilmarnock, Montross, Warsaw, and Whitestone. The total land area of the peninsula is 738 square miles with an approximate length of 60 miles and an average width of 15 miles.

Physical Environment

The land and environment of the Northern Neck cannot be considered apart from the surrounding waters of the Chesapeake Bay. The Northern Neck Region has a 1,210 mile shoreline with the Chesapeake Bay and its tributaries. The soil, topography and geology of the Northern Neck are the result of sea level changes and the sedimentation and marine processes of the Chesapeake Bay and its watershed. The abundant and valuable natural resources in the region are inextricably linked to these same influences.

Climate

The Northern Neck enjoys a temperate, semi-maritime climate with mild winters and warm, humid summers. The frost free growing season ranges from 193 days in Westmoreland County to 212 days in Lancaster County. Precipitation is evenly distributed throughout the year with the maximum in July (average 4.31 inches) and the minimum in February (average 2.71 inches). The annual mean precipitation, as determined at the Eastern Virginia Research Station in warsaw, is 42.61 inches. On an average year, 23 inches of this precipitation falls during the growing season, April to September, and 17.3 inches during the winter as snow. Temperatures average about 37 degrees in January and 77 degrees in July.

Topography and Physiography

Although the Northern Neck lies entirely within the Southern Coastal Plain, the relief of the region varies between flat coastal lands and hillier areas more typical of the Piedmont. Three physiographic subregions are found in the peninsula which represent this variation in land and topography: the fluvial river terrace, the coastal plain upland, and the low marine terrace.

The fluvial river terrace, which ranges from sea level to 10 feet above sea level, includes tidal marsh areas along the major rivers and creeks and some adjacent lands. The low marine terrace which ranges from 10 to 50 feet above sea level, typically lies between the fluvial river terrace and the upland. These two subregions make up a band of level terraces along most of the Rappahannock River, the Chesapeake Bay and the lower portion of the Potomac river. This band is absent along portions of the Richmond County's Rappahannock River Shoreline and Westmoreland County's Potomac River Shoreline where the coastal plain upland meets the water, forming steep cliffs that rise up to 140 feet above the rivers' edge.

The coastal plain upland ranges from about 90 to 170 feet above sea level and includes the inland plateaus as well as the cliffs along the two major rivers. In the inland areas, these lands are a nearly level to gently undulating plain, with a well established, deeply cut drainage system. The drainways and their steep sidewalls cover about 50 percent of the coastal plain upland and are the dominant feature in many parts of the region.

Natural Resources

The coastal environment of the Northern Neck is largely responsible for the regions bounty of renewable, natural resources. The fertile soils, formed from marine and fluvial sediments, provide a strong base for agriculture and forestry. The waters of the Bay and its tributaries provide a healthy environment for fin fish and shell fishing. Together, the production and harvest of these renewable resources serves as the mainstay of the Northern Neck economy.

Soils

Soil characteristics play a major role in determining the suitability of waste management systems and landfill facilities. The soils found throughout the Northern Neck vary widely in their structure, permeability, depth to water table and other features. Much of the land is suitable for field crops and pine forests. Many of the soil types which cover portions of the area are unsuitable for residential and commercial development due to a high water table and poor permeability.

Soil surveys cite a number of soil features which are considered in rating soil type suitability for trench landfills. These include: permeability, depth to bedrock, or to a cemented pan, water table, slope, flooding periodicity, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. According to the standards used by the Soil Conservation Service, Kempsville soils are most suitable, of those found in the Northern Neck, for trench sanitary landfills.

Prime Farmland and Forestland

Prime farmland is defined by the U.S. Department of Agriculture as land that is best suited to the production of crops for food, feed, forage, fiber and oilseed. The requirements for designating prime farmland include: sufficient growing season; adequate moisture from precipitation or irrigation; and sufficient soil quality with respect to soil acidity, alkalinity, drainage, erodibility, slope and other factors.

Land can also be catalogued based on its potential to produce timber. Timber productivity and quality is related to the soil characteristics, available moisture, drainage and topography of a site. Sites are classified according to the volume of wood they are capable of producing in a year.

The prime lands and soils of the Northern Neck represent a finite resource. Where these lands are lost to urbanization and other higher intensity land uses, they are removed from production for the foreseeable future. Left in their natural state, however, these lands are capable of yielding their sustainable agricultural and forest resources indefinitely.

Many acres of prime farmland and forested land are converted each year to more intensive land uses. The conversion of prime farmland operations in response to changes in the demand and supply of agricultural products degrades the resource base of renewable, sustainable industries.

The lands most suitable to sanitary landfill construction and operation, (Kempsville soils), are also considered prime agricultural land. Due to the severe environmental impacts which may result from improper landfill siting, the acreage of prime farmland that is lost when a landfill is sited on suitable soils is generally considered a relatively small environmental and economic impact.

Fish and Shellfish

The catching of seafood and manufacture of processed seafood and marine products plays a vital role in the economy of the Northern Neck. Several species of saltwater fish are found in the estuaries of the Northern Neck, including rock fish, spot, yellow and white perch, herring, shad and eels; also some sea trout, flounder, sunfish and bluefish occur.

Freshwater species are found in ponds and the freshwater portions of the creeks and rivers. In the freshwater ponds, there are populations of large mouth bass and bluegills, as well as chain pickerel, carp, crappie, sunfish and catfish.

Shellfish, such as oysters, that are harvested in the waters of the Bay and its tributaries are a potentially bountiful resource. Over recent years, however, oysters have demonstrated an acute sensitivity to the environmental stresses caused by water pollution. Being sessile throughout their adult life, oysters are unable to avoid contaminated waters; and being filter feeders oysters concentrate bacteria, viruses, heavy metals, pesticides and other pollutants that are found in the surrounding water. The mismanagement of solid waste could pose a threat to the oyster harvest and fishing industries of the Northern Neck.

Wetlands

Along the shoreline and within the creeks and estuaries of the Northern Neck, wetlands and marshlands provide important transitional zones between land and water. Wetlands can be classified into two groups: tidal and non-tidal. Both types perform a wide variety of environmental functions. These functions include: the buffering and stabilization of the shoreline from the process of coastal erosion; the storage of surface water for groundwater recharge; the buffering and absorption of flood waters; the production and transport of detrital food material; the filtering and cleansing of runoff and other waters which pass through the wetlands; and the provision of wildlife and waterfowl habitat.

A wide range of mans' activities can adversely affect the health and natural beauty of wetlands. Wetlands are extremely vulnerable to activities such as dredging, filling, water pollution, and other hydrologic changes. This is due primarily to the fact that wetland are not suitable to normal use and habitation by man and are easily disruptable through modifications to their physical characteristics and surroundings.

Landfills adversely affect wetlands in much the same way that they impact groundwater and surface water resources. These impacts may be direct, such as dredging or filling or indirect such as sedimentation, the leaching of toxins, or the modification of natural drainage causing scouring and desiccation. The cumulative effects of wetlands loss create numerous sever impacts upon water quality, living marine resources, and the fishing industry of the Northern Neck.

Groundwater

The vast quantity of water that underlies the land of tidewater Virginia is the Northern Neck's only developed source for domestic water. The seemingly endless supply of high quality groundwater, whether extracted by relatively shallow private wells or deeper commercial wells, supply all of the water used in homes and businesses. There is evidence of a strong link between groundwater quality and the quality of nearby creeks and rivers. For these reasons the quality of groundwater is of utmost concern for all who live in the Northern Neck.

Most of the water used in the Northern Neck comes from three aquifers: the water-table aquifer, the principal artesian aquifer, and the upper artesian aquifer. In general, the aquifers are tilted relative to the surface, dipping downward from west to east. The water-table aquifer is unpressurized, close to the ground surface, and generally accessed by shallow "dug" wells. The principal artesian aquifer is much deeper, ranging from 300 to 550 feet below the surface. The upper artesian aquifer lies between the principal artesian aquifer and the water table aquifer, ranging in depth from 200 to 375 feet.

Impacts on groundwater are one of the biggest concerns of the siting and operation of a landfill in the Northern Neck. Groundwater pollution can occur from various types of contaminants found in landfills. Contaminants stored at the ground surface can move through the ground and pollute the water table and the deeper aquifers depending on local geologic conditions.

In the Northern Neck, the pollution potential to groundwater from these and other sources is high because of the geology of the unconsolidated sand, clay, marl and shale/shell strata that allow for high mobility of waterborne contaminants. The water-table aquifer is especially vulnerable to contamination from improper methods of solid waste storage and disposal. The artesian aquifers are vulnerable at their recharge areas, most of which are found to the west of the area. The high degree of sensitivity of the regions groundwater resource and the importance of this resource to its citizens, indicate that vigilance be maintained to insure its continued quality and integrity.

The degradation of water quality creates subsequent declines in populations of fish, shellfish, and aquatic vegetation. Such declines, and their potential occurrence are extreme hazards for the environment and economy of the Northern Neck. As aquatic vegetation declines, the effects of pollution, and sedimentation accelerate and the waterbody loses its ability to recover.

Game and Wildlife

The mixed pattern of adjoining fields, forests and streams throughout the Northern Neck provides a favorable habitat for upland game. White-tailed deer, quail, and mourning doves are prevalent throughout the region. Red and gray foxes, gray squirrels, cottontail rabbits, raccoons and opossums are also found, as well as the introduced Iranian pheasant. In the marshes and streams are numerous muskrats, moderate numbers of beaver and mink and occasional otters.

On the estuaries and on the bordering rivers there are moderate wintering populations of waterfowl including Canadian geese, canvas backs and others. There are also many kinds of shore and wading birds such as killdeer, snipe rails, bitterns, herons, sandpipers, and egrets. The Northern Neck has several types of birds nationally classed as endangered or rare species including the bald eagle, ospreys, and cattle egret.

In the siting of sanitary landfills, locations are sought which lead to fewer impacts on populated areas. These areas are often undeveloped, natural settings which provide habitat for wildlife and may be negatively impacted by improper landfill siting and pollution.

These impacts are to some degree unavoidable given the need to separate landfill facilities from populations. However where unique endangered or highly productive habitats are identifiable the concerns for game and wildlife conservation should play a strong role in the decision making process for waste management.

Air Quality

The Virginia Air Pollution Control Board has the responsibility to monitor air quality in the Commonwealth and to ensure that the quality of air meets the standards defined in the Virginia Air Pollution Control Law and Regulations. The Air Pollution Control Board had until recently maintained a regional office and monitoring station in nearby Tappahannock. This office was closed in March of 1987 because of consistently high air quality readings observed.

The impacts of sanitary landfills on air quality include airborne pollutants and odors. These impacts can be taken into consideration with respect to prevailing winds and population centers in the siting of landfill facilities.

Landfills odors and pollutants can be minimized through timely and effective coverage practices and adequate perimeter vegetation.

Land Use Patterns and Practices

Industrial, commercial, and residential land use patterns are important factors in determining methods for the collection and disposal of solid waste.

An overview of land use patterns in the Northern Neck reveals that development in the region has been largely random and scattered. Farming and forestry land practices which exemplify the rural nature of the region, are the two major land uses in the Northern Neck in terms of gross acreage while urban and industrial acreages are a minor fraction of the total land area. Most dense residential development has been confined to the towns until recently. With the rapid influx of retirees and seasonal residents in the past two decades, increasingly dense development is occurring along the hundreds of miles of waterfront property in the region. Speculative pressures have increased the acreage of farm and forest land that is being converted to residential waterfront development and recreational use.

Population

The projected population growth of a region is one of the principal determining factors in any analysis of future solid waste generation. By reviewing population growth trends it is possible to estimate current and future solid waste production rates in the region.

From 1960 to 1970, the population of the Northern Neck declined by 1.2 percent. This trend was dramatically reversed during the 1970's with a population growth rate of 12.7 percent. The growth rate in the 80's for the region was a more moderate 7.9 percent.

The population of the Northern Neck is atypical in a number of respects. Factors which influence demographic characteristics include the rural nature of the region; sparse transportation links with adjacent peninsulas; the lack of employment opportunities within the district; and a unique set of environmental conditions which both attract outsiders and limit future development. The Northern Neck is clearly faced with an aging population caused by the out-migration of youth in search of employment and an in-migration of retirees attracted by the numerous scenic and waterfront areas. It is projected that the total population of the Northern Neck will increase by almost 33 percent by the year 2030.

Table 2.1
Population of the Northern Neck
1980-2030

Locality	1980	1990	2000	2010	2020	2030
Lancaster	10,129	10,896	11,941	12,999	14,700	15,800
Northumberland	9,828	10,524	11,025	11,526	12,000	12,500
Richmond	6,952	7,273	8,029	8,784	10,100	10,900
Westmoreland	14,041	15,480	16,485	17,490	18,400	19,400
Northern Neck	40,950	44,173	47,480	50,799	55,200	58,600

Source: U.S. Bureau of the Census, Virginia Employment Agency, and Northern Neck Planning District Commission.

Economy

The Northern Neck has historically been a self-supporting society based on the agriculture, forestry and fishing industries. Commercial fishing, although declining in recent years, still generates small industries throughout the district, principally seafood processing plants. A significant number of residents have made their living by fishing for menhaden, crabs, oysters, and other seafood. Closely related to the plentiful seafood is the recreational activities that attract large numbers of weekend, vacation, and seasonal residents to the Northern Neck while waterfront development and historic landmarks have attracted tourists and retirees. Less apparent, yet steadily increasing, are the support activities including finance, real estate, government and trade which have also increased over the last decade.

Agriculture has been a major source of employment in the area but with increasing mechanization and the demise of the small farms, fewer people are employed in this sector of the economy. Soybeans, corn, and small grain are the major crops while hogs and cattle are the most common livestock raised and sold in the Northern Neck.

Those residents not employed in the traditional basic industries or supporting activities commute to places of employment in surrounding counties, the cities of Richmond, Fredericksburg, Washington D.C. and Newport News.

The major retail trade centers within the district include the towns of Colonial Beach, Kilmarnock, Montross and Warsaw all of which provide a variety of retail services. Much trade is carried on outside of the district in the metropolitan areas.

The information presented in tables 2.2 through 2.4 gives a brief overview of past trends and potential growth for the economy of the Northern Neck. As shown in Table 2.2 the total taxable sales in the region have increased by 51 percent from 1981 to 1990.

While total taxable sales data provides an overall picture of the local economy, taxable sales data segregated by business classification allows for analysis of specific industry and its relative importance to the local economy. Table 2.3 presents taxable sales data by business classification as well as the relative importance, by percent, of each industry category and the percent change by industry category and the percent change by industry for the period between 1981 and 1990. The largest increase was in the machinery and equipment classification at 770 percent followed by apparel at 234 percent and lumber and supplies at 128 percent.

Table xx presents the per capita income trends in the northern neck from 1981 to 1986. The per capita income for residents has shown a healthy increase of 42.8 percent for the period, slightly exceeding the increase for the state.

Table 2.2
Total Taxable Sales by County

Locality	1981	1990	Change
Lancaster	\$45,607,663	\$60,184,145	32%
Northumberland	\$17,538,425	\$31,133,681	78%
Richmond	\$26,348,792	\$42,115,803	60%
Westmoreland	\$28,855,809	\$45,355,373	57%
Northern Neck	\$118,556,198	\$198,614,919	68%

Source: Virginia Department of Taxation.

Table 2.3
Taxable Sales in the Northern Neck by Classification

Classification	1981	1990	Change
Apparel	\$1,759,861	\$5,877,389	234%
Automotive	\$11,396,955	\$16,533,388	45%
Food	\$48,501,774	\$70,875,560	46%
Furniture & Home Furnishings	\$3,078,434	\$4,544,247	47%
General Merchandise	\$7,831,720	\$12,729,223	63%
Lumber & Supplies	\$9,542,399	\$21,797,278	128%
Fuel	\$1,544,054	\$1,209,181	-22%
Machinery & Equipment	\$473,331	\$4,116,152	770%
Hotels & Motels	\$7,035,139	\$10,941,048	56%
Miscellaneous	\$7,326,088	\$14,134,367	93%
Other	\$20,066,443	\$35,857,086	79%

Source: Virginia Department of Taxation.

Labor force statistics for the period from 1981 to 1990 are represented in Table 2.4. The Northern Neck's unemployment rate has experienced a steady decline during this period going from 13.3 percent in 1981 to 7.9 percent in 1990. The overall size of the labor force has fluctuated around a median of 18,499 workers while the number of employed workers has increased steadily with an overall increase of 7.1 percent. In addition, the difference in unemployment rates between the State and the Northern Neck has decreased from just over 7 percentage points in 1981 to 3.7 in 1990.

Table 2.4
Northern Neck
Labor Force Data

Year	Labor Force	Employed	Unemployed	Unemp. Rate
1981	18,680	16,186	2,493	13.3%
1982	18,759	16,163	2,596	13.8%
1983	18,526	16,234	2,292	12.4%
1984	18,879	16,595	2,283	12.1%
1985	18,019	15,872	2,147	11.9%
1986	18,024	16,055	1,969	10.9%
1987	18,401	16,758	1,644	8.9%
1988	18,733	17,341	1,391	7.4%
1989	18,895	17,432	1,463	7.7%
1990	19,230	17,655	1,575	8.2%

Source: Virginia Employment Commission.

Section III

Legal Background For

Waste Management Planning

The Federal Role

Local governments have traditionally had primary responsibility for solid waste collection, processing, and disposal, however, over the past 25 years, the Federal and State governments have become increasingly involved in solid waste management. In 1965, the first significant Federal effort in the solid waste management area was initiated with the passage of the Solid Waste Disposal Act. Under this act, the Federal government, through the Bureau of Solid Waste Management, assumed the responsibility for research, training, demonstration of new technology, technical assistance, and grants for state and interstate solid waste management planning programs.

The next significant move on the part of the Federal government was the passage of the Resource Recovery Act of 1970. The legislation widened the focus of the 1965 act to include the recovery of materials and energy from solid wastes and provide funds for demonstration projects in resource recovery. Under the provisions of this act, primary responsibility for solid waste management planning was transferred from the Department of Health, Education and Welfare to the Environmental Protection Agency. In addition, the act provided for several important studies in the area of solid waste management and resource recovery, and allowed the EPA to issue guidelines on waste management and resource recovery.

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA) which greatly expanded the role of the Federal government in the management of solid waste. This act represents an effort by the national government to redirect the emphasis of solid waste management from disposal to conservation and the recycling of materials. It statutorily established the Office of Solid Waste within the EPA to guide the implementations of the law and establish a federal-state-local government partnership (similar to what had been done under the Air and Water Pollution Acts) to share implementation responsibilities. The act is intended to "provide technical and financial assistance for the recovery of energy and other resource discarded materials and to regulate the management of hazardous waste." Congressional findings with respect to solid waste, environment, health, materials, and energy indicate:

RCRA. Sec. 1002

(a) Solid Waste

(1) that the continuing technological progress and improvement in methods of manufacturing, packaging, and marketing of consumer products has resulted in an ever mounting increase, and change in the characteristics, of the mass material discarded by the purchaser of such products;

(2) that the economic and population growth of our Nation, and the improvements in the standard of living enjoyed by our population, have required increased industrial production to meet our needs, and have made necessary the demolition of old buildings, the construction of new buildings, and the provision of highways and other avenues of transportation, which, together with related industrial, commercial, and agricultural operations, have resulted in a rising tide of discarded scrap and waste materials;

(3) that the continuing concentration of our population in expanding metropolitan and other urban areas has presented these communities with serious financial, management, intergovernmental, and technical problems in the disposal of solid wastes resulting from the commercial, industrial, domestic, and other activities carried on in such areas; and

(4) that while the collection and disposal of solid waste should continue to be primarily the function of state, regional, and local agencies, the problems of waste disposal as set forth above have become a matter national in scope and in concern and necessitate Federal action through financial and technical assistance and leadership in the development, demonstration, and application of new and improved methods and processes to reduce the amount of waste and unsalvageable materials and to provide for proper and economic solid waste disposal practices.

(b) Environment and Health

(1) although land is too valuable a national resource to be needlessly polluted by discarded materials, most solid waste is disposed of on open land in open dumps and sanitary landfills;

(2) disposal of solid waste and hazardous waste in or on the land without careful planning and management can present a danger to human health and the environment;

(3) as a result of the Clean Air Act, the Water Pollution Control Act, and other Federal and State laws respecting public health and environment, greater amounts of solid waste (in the form of sludge and other pollution treatment residues) have been created. Similarly, inadequate and environmentally unsound practices for the disposal of solid wastes have created greater amounts of air and water pollution and other problems for the environment and for health;

(4) open dumping is particularly harmful to health, contaminates drinking water and underground and surface water supplies, and pollutes the air and the land;

(5) hazardous waste presents, in addition to the problems associated with non-hazardous waste, special dangers to health and requires a greater degree of regulation than does non-hazardous solid waste; and

(6) alternatives to existing methods of land disposal must be developed since many of the cities in the United States will be running out of suitable solid waste disposal sites unless immediate action is taken.

(c) Materials

(1) millions of tons of recoverable materials which could be used are needlessly discarded each year;

(2) methods are available to separate usable materials from solid waste; and

(3) the recovery and conservation of such materials can reduce the dependence of the United States on foreign resources and reduce the deficit in its balance of payments.

(d) Energy

(1) solid waste represents a potential source of solid fuel, oil, or gas that can be converted into energy;

(2) the need exists to develop alternative energy sources for public and private consumption in order to reduce our dependence on such sources as petroleum products, natural gas, nuclear and hydroelectric generation; and

(3) technology exists to produce usable energy from solid waste.

The basic provisions of the RCRA pertaining to solid waste collection and disposal include the following:

RCRA Sec. 1003

(1) providing technical and financial assistance to State and local governments and interstate agencies for the development of solid waste management plans (including resource recovery and resource conservation systems) which will promote improved solid waste management techniques (including more effective organizational arrangements), new and improved methods of collection, separation, and disposal of nonrecoverable residues;

(2) providing training grants in occupations involving design, operation and maintenance of solid waste disposal systems;

(3) prohibiting future open dumping on the land and requiring the conversion of existing open dumps to facilities which do not pose a danger to the environment or to health;

(4) regulating the treatment, storage, transportation, and disposal of hazardous wastes which have adverse effects on health and the environment;

(5) providing for the promulgation of guidelines for solid waste collection, transport, separation, recovery, and disposal practices and systems;

(6) promoting a national research and development program for improved solid waste management and resource conservation techniques, more effective organizational arrangements and new and improved methods of collection, separation, and recovery, and recycling of solid wastes and environmentally safe disposal of nonrecoverable residues;

(7) promoting the demonstration, construction, and application of solid waste management, resource recovery, and resource conservation systems which preserve and enhance the quality of air, water, and land resources; and

(8) establishing a cooperative effort among the Federal, State, and local governments and private enterprise in order to recover valuable materials and energy from solid waste.

In addition to the above listed legislation, there are numerous other federal laws and regulations that directly or indirectly impact the management of solid wastes. These Include:

- Clean Air Act of 1963 (P.L. 91-604)
- National Environmental Protection Act of 1970
- Noise Pollution and Abatement Act of 1970
- Clean Water Act of 1972
- Federal Insecticide, Fungicide, and Rodenticide Act of 1972
- Federal Water Pollution Control Act of 1972 (P.L. 92-500)
- Surface Mining Control and Reclamation Act of 1977
- National Energy Act
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980
- Hazardous and Solid Wastes Amendments of 1984
- OMB Circular A-95
- Safe Drinking Water Act
- Superfund Amendments and Reauthorization act of 1986
- Toxic Substances Control Act (P.L. 94-469)

The State Role

Until the late 1970's, the State of Virginia's role in solid waste management was limited to the promulgation of rules and regulations relating to the proper disposal of solid wastes. These rules and regulations were designed to control disease and vector populations. The authority to regulate and prescribe the methods of disposal of solid waste was initially vested with the State Board of Health under Section 32-9.1 of the Code of Virginia.

The Authority of the State board of Health to regulate the disposal of solid waste was transferred to the newly created Virginia Department of Waste Management with the passage of the Virginia Waste Management Act in 1986. As the Act states, "the Department of Waste Management shall be deemed the successor in interest to the Department of Health to the extent that this act transfers powers and duties" (c. 492, cl. 4). The Act further provides "that regulations promulgated by the Department of Health concerning solid, hazardous and radioactive wastes shall remain in force and effect until any such regulation is amended, modified or repealed by the Department of Waste Management" (c. 492, cl. 5).

Each county and city in Virginia is responsible for the proper disposal of its solid waste. To assist the local communities in providing satisfactory solid waste disposal facilities, the Department of Solid Waste will furnish technical assistance and will inspect and evaluate each facility. It is also the responsibility of the Department to enforce provisions of the regulations and to issue a permit for each conforming site. In addition to regulating solid waste disposal sites, the state's responsibilities include:

- formation of statewide health and environment policies;
- adoption of minimum standards pertaining to storage and collection of solid wastes;
- provision for financial solid waste management programs;
- provision of a continuous source of information and technical assistance to local government and industry;
- provision of training for operational and administrative personnel at the local level; and
- provision of information for the general public.

The passage of the RCRA on October 21, 1976 provided for additional state responsibilities and considerations for state

plan guidelines. The guidelines consider:

RCRA Sec. 4002.

(1) the varying regional, geologic, hydrologic, climatic, and other circumstances under which different solid waste practices are required in order to insure the reasonable protection of the quality of the ground and surface waters from leachate contamination, the reasonable protection of the quality of the surface waters from surface runoff contamination, and the reasonable protection of ambient air quality;

(2) characteristics and conditions of collection, storage, processing, and disposal methods, techniques and practices, and location of facilities where techniques, and practices are conducted, taking into account the nature of the material to be disposed;

(3) methods for closing or upgrading open dumps for purposes of eliminating potential health hazards;

(4) population density, distribution, and hydrologic growth;

(5) geographic, geologic, climatic, and hydrologic characteristics;

(6) the type and location of transportation;

(7) the profile of industries;

(8) the constituents and generation rates of waste;

(9) the political, economic, organizational, financial, and management problems affecting comprehensive solid waste management;

(10) types of resource recovery facilities and resource conservation systems which are appropriate;

(11) available new and additional markets for recovered material.

Each state plan must comply with the following minimum requirements for approval of the plan.

Sec. 4003.

(1) in accordance with section 4006(b) the plan shall identify the following: the responsibilities of State, local, and regional authorities in the implementation of the state plan; the distribution of Federal funds to the authorities responsible for development and implementation of the state plan; and means for coordinating regional

planning and implementation under the state plan;

(2) the plan shall, in accordance with section 4005(c), prohibit the establishment of new open dumps within the State, and contain requirements that all solid waste (including solid waste originating in other states, but not including hazardous waste) shall be utilized for resource recovery or disposed of in sanitary landfills (within the meaning of section 4004(a)) or otherwise disposed of in an environmentally sound manner;

(3) the plan shall provide for the closing or upgrading of all existing open dumps within the state pursuant to the requirements of section 4005;

(4) the plan shall provide for the establishment of such state regulatory powers as may be necessary to implement the plan;

(5) the plan shall provide that no local government within the state shall be prohibited under state or local law from entering into a long-term contracts for the supply of solid waste resource recovery facilities; and

(6) the plan shall provide for such resource conservation or recovery and for the disposal of solid waste in sanitary landfills or any combination of practices so as may be necessary to use or dispose of such waste in a manner that is environmentally sound.

In 1979, primarily in response to the RCRA, Virginia recognized its approach to solid waste management and began to assume a more active role in the planning and control of solid waste. As a result, the first State Solid Waste Management Plan became effective in October of 1979. The plan contains the basic administrative framework for solid waste management in the state, introduces many new concepts, recommends new state legislation and provides for continued local and regional planning in solid waste management.

As with Federal law, there are number of other State regulations that directly or indirectly impact solid waste management in Virginia. The State Water Control Board regulates disposal under the State Water Control Law (code of Virginia, sec. 62:10-42). The State Air Pollution Control Board under the Air Pollution Control Law (Title 10, Chapter 1.2 of the Code of Virginia) is charged with the regulation of air pollution emissions according to the regulations poulmagated under the Clean Air Act.

The Regional Role

There are a number of local and regional needs in the field of solid waste management that should be considered in any discussion of the subject. First among these is the entry of the Federal government through the RCRA into an area that heretofore had been the responsibility of local and state governments. Under this act, the Environmental Protection Agency, has been issuing regulations concerning the classification and disposal of hazardous wastes, landfill operation and design and other subjects. As with many federal regulations, application of national standards on the local level often increase costs.

In the past, the amount of material entering the solid waste stream has steadily increased and the trend is expected to continue. This requires that local governments continue to dispose of an increasing volume of solid waste in the future, thus escalating the cost and complexity of solid waste management.

In order to more efficiently manage solid waste disposal by local governments, it is advantageous for localities to encourage cooperation on the regional level in both the development and implementation of solid waste management plans. For this reason, the state has mandated that local governments may develop local or regional solid waste management plans.

Under the Virginia Waste Management Act of 1986, "the Governor may designate regional boundaries for solid waste management." It is further stated that "the governing bodies of the counties, cities, and towns within any region so designated shall be responsible for the development of a comprehensive regional solid waste management plan in cooperation with any planning district commission or commissions in such region. Each regional solid waste management plan shall include all aspects of solid waste management. The governing body of each county, city or town shall be responsible for ensuring within its jurisdictional boundaries, the implementation of those portions of the regional solid waste management plan applicable to such county, city or town" (Code of Virginia, Sec. 10-274).

The planning district commissions were designated to develop regional solid waste management plans along state guidelines and the focus of the regional plans is to be resource recovery. State accepted regional plans will be part of the overall state solid waste management plan. The contents of a regional solid waste management plan are to be based on the state strategy for solid waste management. That strategy includes:

- the establishment of goals and objectives for the prevention of adverse effects on the environment resulting from solid waste disposal and collection;

-the identification of waste characteristics by type and volume;

-the identification of disposal options;

-the identification of resource recovery and conservation options and other options for conservation, treatment, or processing of solid wastes;

-the review and analysis of existing responsibilities for solid waste management and existing regulatory problems;

-the analysis of alternative options and recommendations;

-the development of a waste management hierarchy to include the components of planning, source reduction, reuse, recycling, resource recovery, incineration, and landfilling.

In addition to the development of a regional solid waste management plan, provisions exist in the Code of Virginia so that one jurisdiction under contract may operate a regional disposal/recovery facility involving other local jurisdictions. Also under Section 15.1-1420, two or more jurisdictions might elect to form a service district for reducing collection and disposal costs.

The Local Role

Each county and city is responsible for disposal of solid wastes within its jurisdiction. Each must first provide adequate disposal for its residential solid wastes before providing facilities for disposal of other solid wastes. Towns are not required by law to provide such facilities, however, they may do so if they desire. If towns choose to forego this service, counties must provide disposal services to the towns.

Counties and cities may accept solid wastes from commercial, industrial, institutional, or agricultural sources within their jurisdictions for disposal in the same system used for residential wastes, or they may require such solid waste sources to operate separate disposal facilities. In the latter event, such disposal operations shall conform to the requirements of the state, and each person shall be required to hold a valid permit, the same as a county or city.

Cities, counties, and towns must also pass waste disposal ordinances that delineate what may or may not be disposed of at their sanitary landfill sites. These various requirements prove that local solid waste administrators are responsible for more than just seeing that waste is hauled to the landfill. The local jurisdiction must also develop specific plans for the management of solid waste generated within its boundaries. They must enact new or review old local ordinances governing storage and collection of solid waste, provide for financing of solid waste management programs, and operate all solid waste management facilities in compliance with state regulations. In addition, they must give serious consideration to the alternative and innovative options available for the management of solid waste.

In accordance with the Virginia Department of Waste Management's "Regulations For The Development Of Solid Waste Management Plans (VR 672-50-01, 1990) the four counties of the Northern Neck requested that the Planning District Commission develop a regional solid waste management plan. These regulations are promulgated pursuant to Chapter 14 (Sec. 10.1-1400 et seq.) and Sec. 10.1-1411 of the Code of Virginia (1950), as amended, which authorizes the Virginia Waste Management Board to promulgate and enforce such regulations as may be necessary to carry out its duties and powers and the intent of the Virginia Waste Management Act and the federal acts.

Section 2.2 of these regulations states that the Virginia Waste Management Board requires "each region pursuant to Part V of these regulations, as well as each city, county and town not part of such a region, to develop comprehensive and integrated solid waste management plans that, at a minimum, consider all components of the following hierarchy:

1. Source Reduction,
2. Reuse,
3. Recycling,
4. Resource Recovery,
5. Incineration,
6. Landfilling,
7. Plan Implementation.

Part III of VR 672-50-01 covers the objectives and performance required of these plans.

Sec. 3.1 Schedule For Plan Development

"Every city, county and town in the Commonwealth shall develop a solid waste management plan or amend an existing solid waste management plan and submit them for approval in accordance with these regulations. Existing plans may be amended by addendum of items such as consideration of the waste management hierarchy, the recycling program, implementation activities and other requirements of these regulations that are not a part of the existing plan. A local jurisdiction participating in an authorized regional solid waste management plan is not required to develop a separate plan."

A. A complete solid waste management plan in compliance with these regulations shall be provided to the Department of Waste Management no later than July 1, 1991.

B. The Department of Waste Management shall approve or disapprove each plan submitted in accordance with Sec. 3.1.A. no later than July 1, 1992. If the Department of Waste Management disapproves the plan, it shall cite the reasons for the disapproval and state what is required for the approval.

C. Each submitter whose solid waste management plan is disapproved under sec. 3.1.B. shall submit a corrected solid waste management plan to the Department of Waste Management no later than 90 days following notification of disapproval.

D. Plans approved without alteration shall become effective upon notification. If the Department of Waste Management cannot approve the corrected solid waste management plan because it finds the plans not to be in accordance with these regulations, it will issue a notice of disapproval and state what is required for approval. The Department will give priority consideration for review of corrected plans where the local or regional body has a pending permit application for a solid waste management facility.

E. On July 1, 1997 and each succeeding five year period thereafter, each city, county, town or region shall submit a report to the Director updating the plan.

Sec. 3.2 Give the following Mandatory Plan Objectives.

A. The solid waste management plan shall include:

1. An integrated waste management strategy;
2. Objectives for solid waste management within the jurisdiction;
3. Definition of incremental stages of progress toward the objectives and schedule for their accomplishment;
4. Descriptions of the funding and resources necessary, including consideration of fees dedicated to future facility development;
5. Strategy for provision of necessary funds and resources;
6. Strategy for public education and information on recycling; and
7. Consideration of public and private sector partnerships and private sector participation in execution of the plan. Existing private sector recycling operations should be incorporated in the plan and the expansion of such operations should be encouraged.

B. The plan shall describe how each of the following minimum goals were or shall be achieved:

1. By December 31, 1991, a recycling rate of ten percent of total household wastes and principal recyclable materials that are wastes from non-household sources generated annually in each city, county, town or region.
2. By December 31, 1993, a recycling rate of fifteen percent of total household wastes and principal recyclable materials

that are wastes from non-household sources generated annually in each city, county, town or region.

3. By December 31, 1995, a recycling rate of twenty-five percent of total household wastes and principal recyclable materials that are wastes from non-household sources generated annually in each city, county, town or region.

C. Calculation methodology shall be included in the plan.

D. A report on progress in attaining the recycling goals established in Sec. 3.2.B. shall be submitted to the Department of Waste Management within 120 days of the date prescribed in that section. The Department will prepare a statewide summary progress report based on the data submitted.

E. By July 1, 1993, all known solid waste disposal sites, closed and active, within the area of the solid waste management plan shall be documented and recorded at a centralized archive authorized to receive and record information. Thereafter, all new sites shall be recorded at the same central data source.

F. By July 1, 1993, a method shall be developed to monitor the amount of solid waste of each type produced within the area of the solid waste management plan and to record the annual production by solid waste types at a centralized archive. Waste types include, but are not limited to, broad classes such as residential, commercial and industrial, and the major categories of principal and supplemental recyclable materials.

Sec. 3.3. covers the subject of public participation and states the following:

A. Prior to submission of a solid waste management plan to the Department of Waste Management, the submitter shall publish a notice and hold a public hearing on the plan in accordance with the procedures of the local government or regional planning agency.

B. Plan developers should provide for extensive participation by the public through the use of citizen advisory committees and public meetings during the development of the plan.

Section IV

Waste Management Objectives

WASTE MANAGEMENT OBJECTIVES

In developing objectives for waste management, several issues are fundamental driving forces in the planning process for the Northern Neck waste management process. These issues are: a) compliance with regulations, b) economics, c) environmental protection, d) citizen needs and participation, and e) politics.

The following five objectives have been developed as key issues to consider in the development of a waste management strategy.

1. To consider the regions' environmental needs in developing waste management and recycling strategies so that the entire region is protected and enhanced by our activities.
2. To meet the State recycling mandates.
3. To develop a waste management plan that considers all components of the following hierarchy:
 1. Source Reduction
 2. Reuse
 3. Recycling
 4. Resource Recovery
 5. Incineration
 6. Landfilling
 7. Plan Implementation
3. To implement a waste management plan that addresses the needs of the citizens and the environment with the least amount of additional administration and expenditures.
4. To develop a waste management plan that allows the localities the option to change/modify strategies over time based on politics, economics, technology, and common sense.
5. To promote recycling as a business in order to encourage business development and employment opportunities.

Section V

Waste Management Hierarchy

Waste Management Hierarchy

In developing a integrated solid waste management plan, a combination of techniques and programs should be developed. Waste is composed of a number of different elements, and each element can be disposed of separately. Consequently, a variety of techniques can be developed, each to address specific elements of a localities waste management problems. Although this plan will choose a selected mix of alternatives that is based on their effectiveness in meeting the regional goals, the hierarchy of integrated waste management techniques will be discussed in the following section because of its usefulness as a tool for goal setting and planning.

Source Reduction and Reuse is at the top of the waste management hierarchy. The Environmental Protection Agency's (EPA) documentation on solid waste defines source reduction as "the design manufacture and use of products so as to reduce the quality and toxicity of waste produced when the products reach the end of their useful lives".¹ Reuse is the use of a product more than once in its same form for the same purpose. Programs promoting source reduction are becoming more common.² These programs impact the waste stream by decreasing the amount and toxicity of material that is discarded through manufacture, design and packaging of products with minimum toxic content, minimum volume of material and/or longer useful life. Source reduction includes product reuse, reduced material volume, reduced toxicity, increased product lifetime and decreased consumption.

Presently, source reduction is not a widely utilized concept as a tool for waste reduction.³ Widespread implementation of this concept must be initiated at the national level, however a number of actions can be encouraged at the local level, such as increased consumer education. Education programs should address the need and importance of source reduction.

Since the major thrust of a source reduction program must be initiated at the national level, this component of the hierarchy will be addressed only in an educational framework. Information discussing the Northern Neck's approach to this component can be found in the "education" component of this plan.

Recycling (including composting) is the second component of the waste management hierarchy. Recycling, one of the most widely used tools of the waste management hierarchy, is defined as the separation, collection and processing (or remanufacturing) of post consumer materials. According to the EPA, in 1989, only 10 percent of products discarded were recycled.⁴ Recycling can reduce the amount of landfill space necessary for waste materials

and save resources and money for communities. In most communities recycling programs are relatively new, and mistakes are bound to be made. The most successful programs across the nation began as small pilot programs. By beginning on a small scale, decision makers can gain expertise gradually and minimize costly problems.

The Northern Neck plans to adapt this small scale approach to their waste management. By evaluating the programs that are in place decision makers will be able to compare and evaluate which programs are the most successful and least costly. (see section on Future Waste Systems).

Incineration is the next component on the waste management hierarchy. Incineration can reduce some amounts of waste and provide a valuable resource for energy production. However this technology poses some risks to humans and the environment. In addition, this technology is costly to develop. Communities with small populations will not find this a viable solution for waste management unless for some reason they find that they produce or acquire a large volume of waste. Consequently, the option will not be utilized in the Northern Neck at this time.

Landfilling is a method of managing and storing non-recyclable materials. Landfills are the most widely used waste management method in the nation. Although most communities landfill their waste, landfills create a number of problems. Environmental concerns arise because of the lack of space and the adverse effects resulting from the materials that are being placed back in the earth. Economics are a central concern because of increased regulations governing the development and closure of landfills.

Presently the Northern Neck is landfilling at sites in two counties. This landfilling process is expected to continue for a few years. (For more information on landfilling in the Northern Neck see the section on Present Waste Systems).

Notes

1. United States Environmental Protection Agency. Decision-Makers Guide to Solid Waste Management. 1989. pp. 51-57.
2. Ibid.
3. Ibid.
4. Ibid. p. 59.

Section VI

Waste Stream Characteristics

Waste Stream Characteristics

The single greatest limitation to solid waste management planning in the Northern Neck is the lack of data concerning the characteristics of the waste stream. At no point during the process of waste transport and disposal is its weight or volume measured. The private haulers who transport the refuse generally charge based upon a regular pick-up schedule, rather than on the amount of waste, and disposal in the landfills has been free. There has been no need to measure or record the amount of waste passing through the system.

In the development of this plan, estimates of present and future waste stream characteristics were gathered from a variety of sources. Basically, they are of two types: national and statewide estimates, and local estimates. The national and statewide estimates have the advantage of being fairly precise, having been based upon detailed waste stream and market studies. However, it is uncertain how well these studies of general trends translate to the rural communities of the Northern Neck. The local estimates are specific to the area, but tend to be imprecise.

In order to gain a more informed understanding of the types of refuse entering the landfills of the Northern Neck, The Northern Neck Recycling Task Force, a local citizens group, was recruited to survey the waste stream at the Tri-County landfill. During one week in mid-February, 1991, volunteers monitored the landfill, estimating the volume and composition of the waste entering the pit. Results from this survey were used to verify existing waste stream estimates. (Another survey is planned for mid-July, 1991.)

Additionally, engineering estimates of the rate at which the two landfills of the Northern Neck are being filled were compared to estimates of national waste stream characteristics.^{1,2,3} In the case of the Tri-County landfill the two estimates were remarkably close. This would indicate that the waste stream of the Northern Neck is similar to that of the Nation as a whole. Though the estimates for the Westmoreland County landfill were not nearly so close, the discrepancy is probably attributable to other factors. (See discussion of Westmoreland Counties current waste system in Section VII.)

At the state level, the "Recyclable Materials Market Study"⁴, produced for the Department of Waste Management by MIDAS Inc., was considered as a possible source for estimates of available recyclables in the waste stream. The study was limited, though, in that it did not address the waste stream as a whole, and only made estimates of certain marketable recyclables.

For the purposes of this plan the estimate of total primary waste stream for each county is based upon the Environmental Protection Agency publication "Characteristics of Municipal Solid Waste in the United States: 1990 Update".⁵ As mentioned above, these estimates were found to be consistent with much of the data collected at the local level. In addition, the EPA study was by far the most comprehensive, providing twenty year projections for all components of the primary waste stream. This allows for a much greater consistency when comparing the relative importance of different materials in the waste stream.

Throughout this section "recyclable materials" refers only to those "traditional" recycling materials found in the conventional residential and commercial waste stream. Such materials as used oil, scrap metal, tires and arboreal materials are addressed in Section VIII:Special Waste.

It should be noted that volume estimates assume that materials are compacted in landfills. The conversion factors from weight to volume are taken from the EPA study.⁶

Recycling

As with the waste stream characteristics, accurate data does not exist for the amount that is presently being recycled. What is available must be gathered from many different sources.

Two of the largest recycling operations in the area, a community group and a private business, have both been in operation for less than a year. Though both keep fairly detailed records, the rate that they have received materials in the first few months may not be representative of their long term capabilities.

Additional data was derived from two surveys of businesses, one of the four county region conducted by the Planning District Commission, the other of Westmoreland County alone, conducted by the County government.^{7,8} Only a small percentage of the survey forms were returned, and most of those contained only rough estimates of amounts. Few of the businesses which do recycle keep accurate records.

The estimates of recycling should therefore only be considered a general indication as to the magnitude of present recycling trends.

Lancaster County

**Table 6.1: Waste Stream Projections
(Cu. Yds./Year)**

	1990	1995	2000	2005	2010
Recyclables					
Glass Bottles	307	308	284	274	264
Steel Cans	380	392	367	348	329
Aluminum Cans	412	669	785	817	848
HDPE Plastic	108	123	126	141	156
PET Plastic	103	149	176	204	234
Office Paper	800	1,078	1,316	1,577	1,843
Newspaper	1,236	1,650	1,829	2,030	2,235
Cardboard	2,163	3,238	3,712	4,301	4,904
Total Recyclables	5,509	7,607	8,595	9,692	10,813
Total Waste Stream	20,776	22,420	24,565	26,985	29,451
Twenty Five Percent of TWS	5,194	5,605	6,141	6,746	7,363

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 6.2: Mile Stones for Reaching Recycling Mandates

Year	Waste Stream Cu. Yds./Year	Recycling Mandate (%)	Recycling Mandate Cu. Yd./Year
1991	21,105	10 %	2,111
1993	21,762	15 %	3,264
1995	22,420	25 %	5,605

Source: Northern Neck Planning District Commission

**Table 6.3: Estimates of Current Recycling
Cu. Yd./Year**

Paper	328
Cardboard	864
Aluminum Cans	306
Steel Cans	43
Glass Bottles	35
Total	1,576

Source: Northern Neck Planning District Commission

Northumberland County

**Table 6.4: Waste Stream Projections
(Cu. Yds./Year)**

	1990	1995	2000	2005	2010
Recyclables					
Glass Bottles	297	291	262	248	234
Steel Cans	367	371	338	315	292
Aluminum Cans	398	631	725	738	752
HDPE Plastic	104	117	116	127	138
PET Plastic	100	140	162	185	207
Office Paper	773	1,017	1,215	1,425	1,635
Newspaper	1,194	1,556	1,688	1,835	1,982
Cardboard	2,089	3,054	3,426	3,888	4,348
Total Recyclables	5,322	7,177	7,932	8,761	9,588
Total Waste Stream	20,067	21,150	22,700	24,394	26,114
Twenty Five Percent of TWS	5,017	5,288	5,675	6,099	6,529

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 6.5: Mile Stones for Reaching Recycling Mandates

Year	Waste Stream Cu. Yds./Year	Recycling Mandate (%)	Recycling Mandate Cu. Yd./Year
1991	20,284	10 %	2,028
1993	20,717	15 %	3,108
1995	21,150	25 %	5,288

Source: Northern Neck Planning District Commission

**Table 6.6: Estimates of Current Recycling
Cu. Yd./Year**

Paper	320
Cardboard	311
Aluminum Cans	305
Steel Cans	43
Glass Bottles	35
Total	1,014

Source: Northern Neck Planning District Commission

Richmond County

Table 6.7: Waste Stream Projections
(Cu. Yds./Year)

	1990	1995	2000	2005	2010
Recyclables					
Glass Bottles	205	206	191	185	178
Steel Cans	254	263	246	235	222
Aluminum Cans	275	448	528	550	573
HDPE Plastic	72	83	84	95	105
PET Plastic	69	100	118	138	158
Office Paper	534	722	885	1,063	1,246
Newspaper	825	1,105	1,229	1,368	1,510
Cardboard	1,444	2,169	2,495	2,899	3,313
Total Recyclables	3,678	5,096	5,776	6,533	7,305
Total Waste Stream	13,868	15,019	16,509	18,187	19,901
Twenty Five Percent of TWS	3,467	3,755	4,127	4,547	4,975

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 6.8: Mile Stones for Reaching Recycling Mandates

Year	Waste Stream Cu. Yds./Year	Recycling Mandate (%)	Recycling Mandate Cu. Yd./Year
1991	14,098	10 %	1,410
1993	14,559	15 %	2,184
1995	15,019	25 %	3,755

Source: Northern Neck Planning District Commission

Table 6.9: Estimates of Current Recycling
Cu. Yd./Year

Paper	43
Cardboard	622
Aluminum Cans	13
Steel Cans	5
Glass Bottles	5
Total	688

Source: Northern Neck Planning District Commission

Westmoreland County

Table 6.10: Waste Stream Projections
(Cu. Yds./Year)

	1990	1995	2000	2005	2010
Recyclables					
Glass Bottles	436	431	391	373	354
Steel Cans	540	550	506	475	443
Aluminum Cans	585	936	1,084	1,112	1,141
HDPE Plastic	154	173	173	191	210
PET Plastic	147	208	243	279	314
Office Paper	1,137	1,508	1,816	2,147	2,480
Newspaper	1,756	2,309	2,524	2,765	3,007
Cardboard	3,073	4,531	5,123	5,858	6,598
Total Recyclables	7,828	10,646	11,860	13,200	14,547
Total Waste Stream	29,517	31,373	33,896	36,752	39,626
Twenty Five Percent of TWS	7,379	7,843	8,474	9,188	9,907

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 6.11: Mile Stones for Reaching Recycling Mandates

Year	Waste Stream Cu. Yds./Year	Recycling Mandate (%)	Recycling Mandate Cu. Yd./Year
1991	29,888	10 %	2,989
1993	30,631	15 %	4,595
1995	31,373	25 %	7,843

Source: Northern Neck Planning District Commission

Table 6.12: Estimates of Current Recycling
Cu. Yd./Year

Paper	460
Cardboard	380
Aluminum Cans	292
Steel Cans	144
Glass Bottles	136
Total	1412

Source: Westmoreland County Staff

Northern Neck

**Table 6.13: Waste Stream Projections
(Cu. Yds./Year)**

	1990	1995	2000	2005	2010
Recyclables					
Glass Bottles	1,251	1,242	1,156	1,093	1,043
Steel Cans	1,540	1,573	1,489	1,396	1,310
Aluminum Cans	1,511	2,450	3,028	3,204	3,300
HDPE Plastic	430	485	501	543	598
PET Plastic	391	556	667	783	891
Office Paper	3,081	4,081	5,034	6,001	6,995
Newspaper	4,771	6,257	7,140	7,852	8,589
Cardboard	8,117	12,027	14,384	16,484	18,703
Total Recyclables	21,092	28,671	33,399	37,356	41,429
Total Waste Stream	83,784	88,879	96,121	104,594	113,373
Twenty Five Percent of TWS	20,946	22,220	24,030	26,149	28,343

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 6.14: Mile Stones for Reaching Recycling Mandates

Year	Waste Stream Cu. Yds./Year	Recycling Mandate (%)	Recycling Mandate Cu. Yd./Year
1991	84,783	10 %	8,478
1993	86,841	15 %	13,026
1995	88,879	25 %	22,220

Source: Northern Neck Planning District Commission

**Table 6.15: Estimates of Current Recycling
Cu. Yd./Year**

Paper	717
Cardboard	1,873
Aluminum Cans	634
Steel Cans	91
Glass Bottles	76
Total	3,391

Source: Northern Neck Planning District Commission

Figure 6.1: Comparison of Available
Recyclables to State Mandates

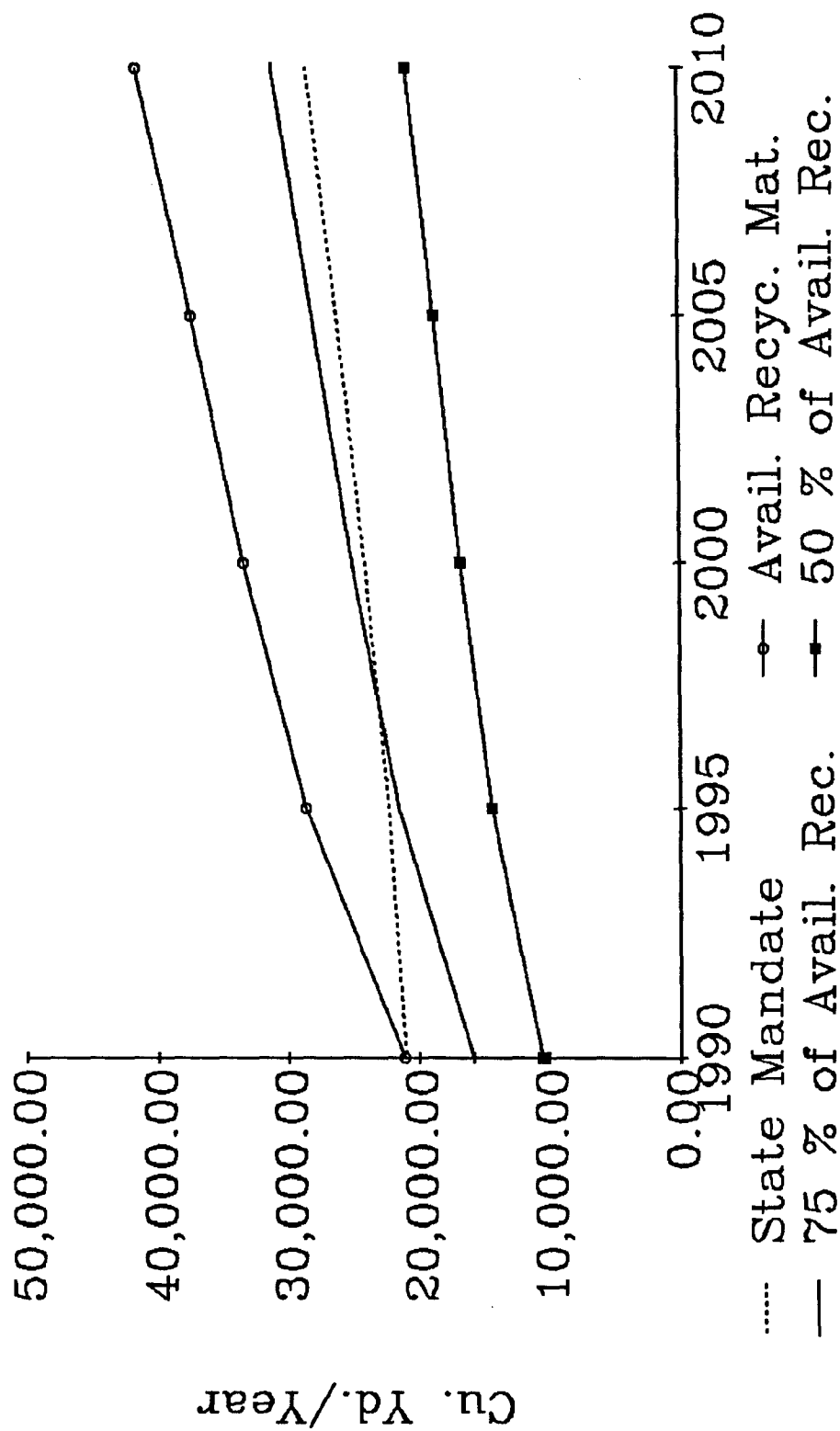


Figure 6.2: Projected Recyclables
in Northern Neck Waste Stream

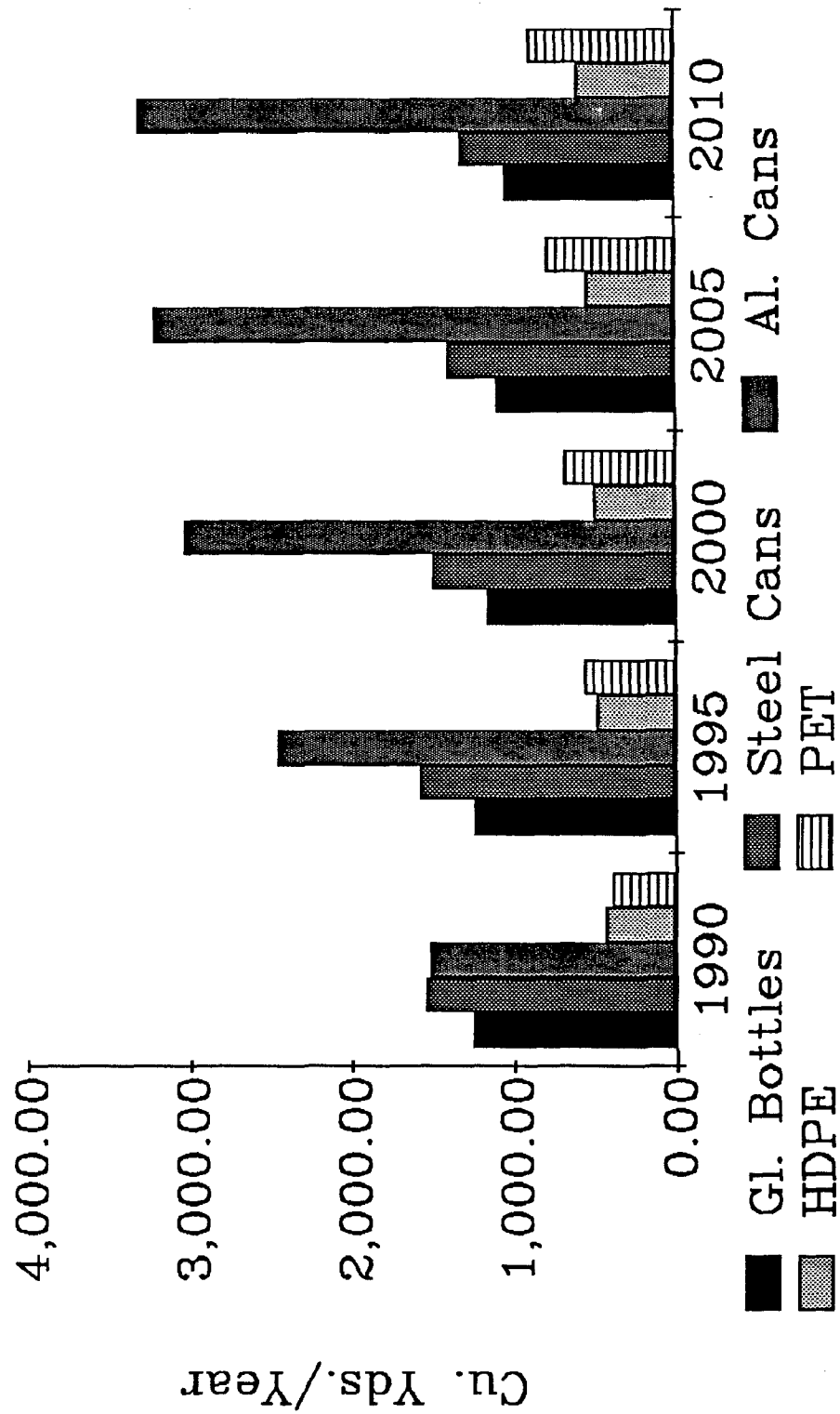


Figure 6.3: Projected Recyclables
in Northern Neck Waste Stream

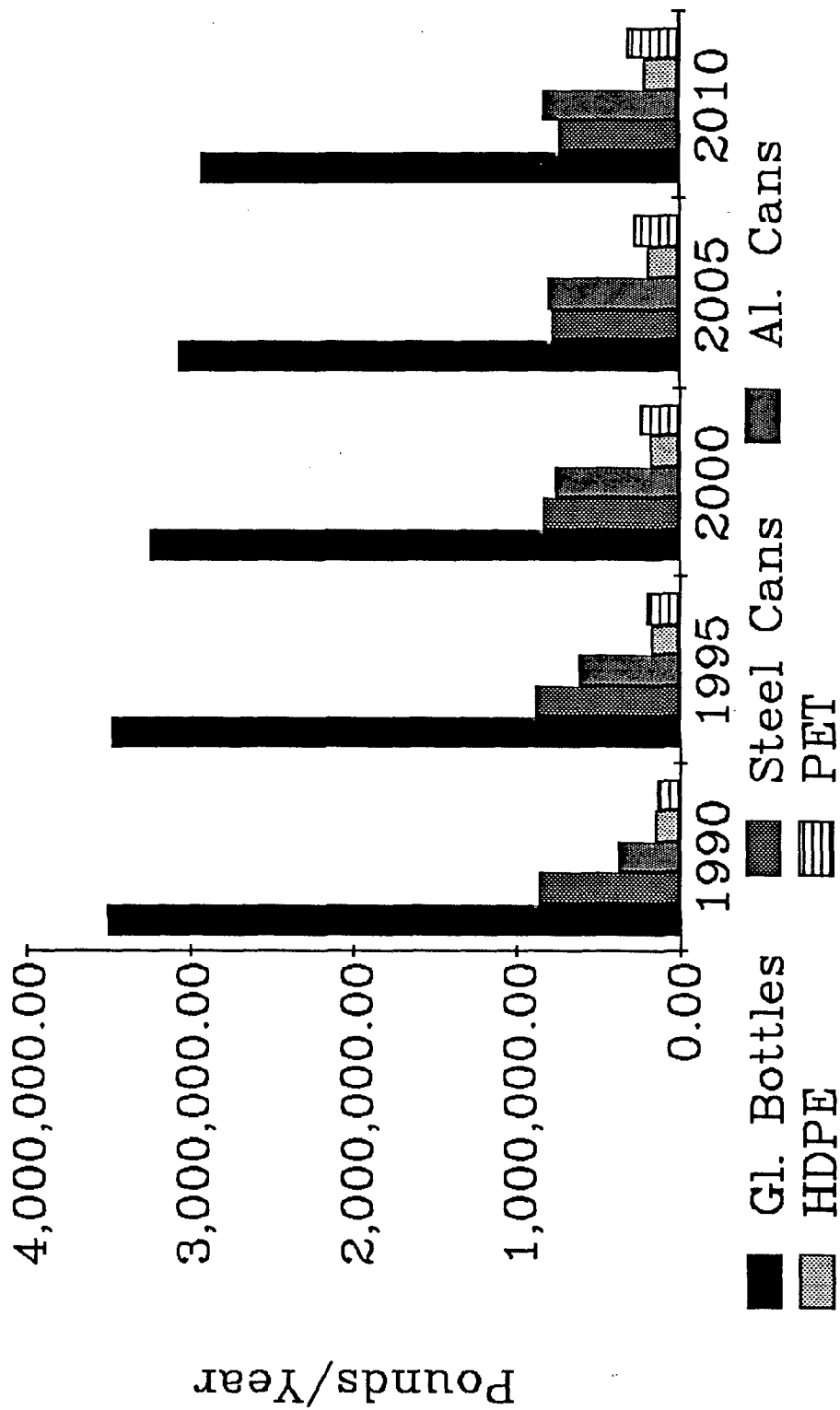


Figure 6.4: Projected Paper
in Northern Neck Waste Stream

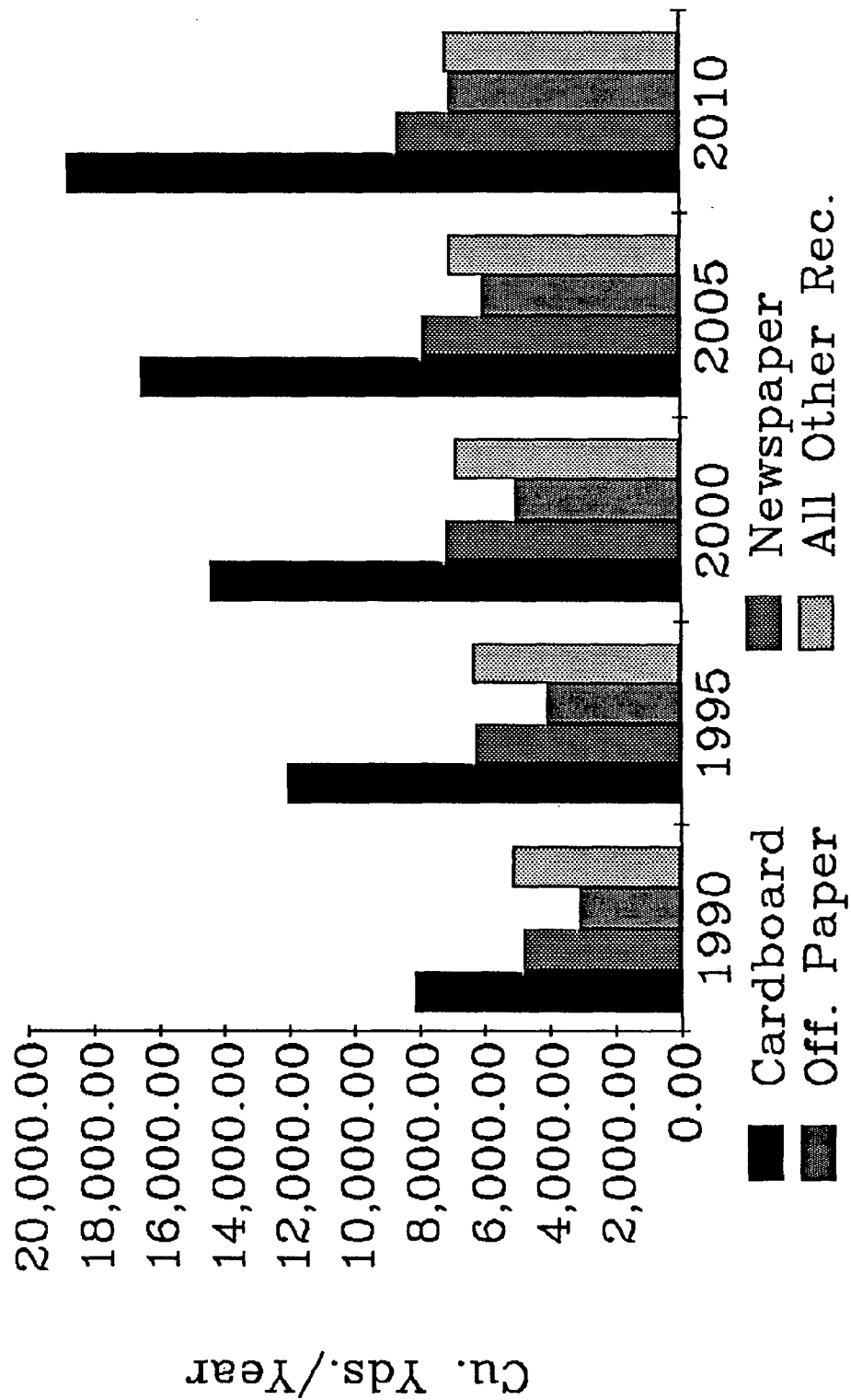
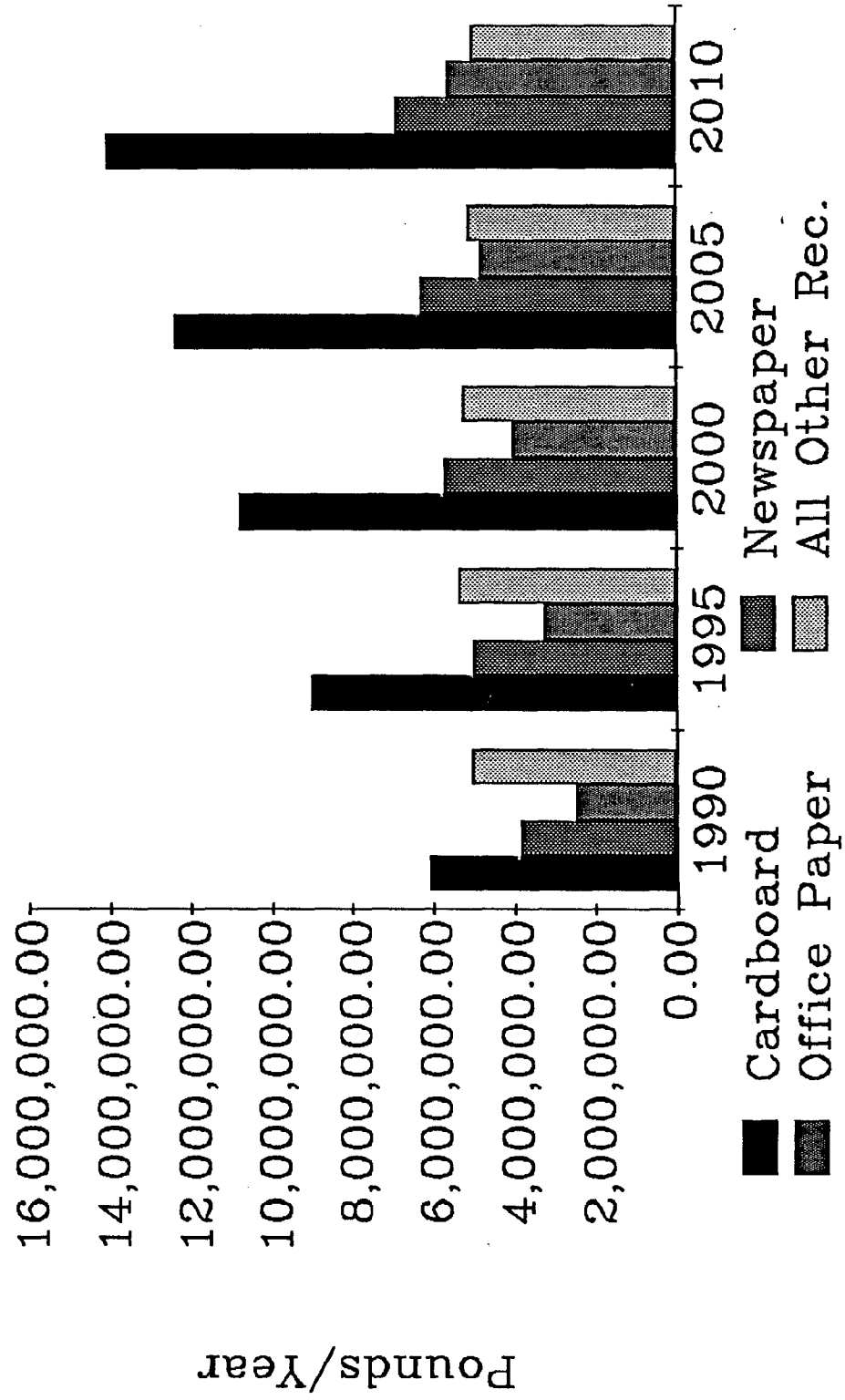


Figure 6.5: Projected Paper
in Northern Neck Waste Stream



Discussion

A comparison of the projected quantity of "traditional" recyclables in the waste stream to the state recycling mandate is shown in figure 6.1. The line labelled "State Mandate" represents twenty five percent of the projected waste stream. The figure indicates that unless the localities of the Northern Neck are able to divert a high percentage of these materials from the waste stream (75%), they will need to pursue other materials to reach the mandated goal. It should also be noted that this comparison is based on the EPA's projection that recyclable materials will account for an increasing percentage of the total waste stream. If this does not prove to be true the mandated goals will be even more difficult to reach. Local programs must include those materials discussed in "Section VIII: Special Wastes" along with the more traditional materials in order to reach their goals.

Among the materials considered in this section the paper products account for the majority of recyclables (76% in 1990, 83% in 2010 by volume). Of this, over half is cardboard. It is interesting that this holds true whether the waste stream is evaluated by volume or weight. In the formulation of a recycling plan, paper products, generally, and cardboard, specifically, deserve special attention.

Notes

1. Culpeper Engineering. "Tri-County Landfill Volume Report". Unpublished Study. 1991. p. 3.
2. Culpeper Engineering. "Westmoreland County Landfill Inspection". Unpublished Study. 1991. p. 2.
3. United States Environmental Protection Agency. Characteristics of Municipal Solid Waste in the United States: 1990 Update. 1990. p. 88.
4. Virginia Department of Waste Management. Recyclable Materials Marketing Program. 1990. pp. 5-10.
5. U.S. E.P.A. 1990. p. 88.
6. Ibid. p. 88.
7. Westmoreland County Staff. [Business Recycling Survey]. Unpublished Raw Data. 1991.
8. Northern Neck Planning District Commission. [Business Recycling Survey]. Unpublished Raw Data. 1991.

Section VII

Existing Waste Disposal Systems

Existing Waste Disposal Systems

Landfills

Tri-County Landfill

Description:

The Tri-County landfill is located on seventy-five (75) acres at Lara in Northumberland County (Map 1). It is operated by Callao Grader Service for the Counties of Lancaster, Northumberland and Richmond. The landfill was originally permitted in 1973, and the operator is presently filling the last cell. The landfill is scheduled to be closed by January 1, 1994, due to the changes in state regulations. At the current rate of consumption the final cell should last until closure.¹ (Closure plans are included in Appendix 1)

The landfill will not accept tires (unless they are split), stumps or yard waste. No tipping fee is charged for disposal at the landfill. Private citizens and commercial haulers drive onto the landfill site and dump directly into the pit. A single employee is responsible both for the maintenance of the site, and supervision of the materials being placed in the pit.²

Concerns:

With only one employee on the site, a complete inspection of incoming waste is impossible. A recent survey of the waste stream by a citizens group found that banned materials such as tires and stumps were being dumped into the landfill.³ As the types of materials not accepted at the landfill continue to become more numerous, this may become a large problem.

Westmoreland County Landfill

The Westmoreland County Landfill is located on ninety-six (96) acres near Montross (map 4). The County is presently filling the third cell on the site. This cell was placed in service on May 14, 1990.⁴ The cell will be closed by January 1, 1993 in order to comply with state regulations. According to engineering estimates the third cell should have enough capacity to receive the anticipated waste from Westmoreland County. The County plans to develop a new cell on the existing parcel, in compliance with new state regulations, by January 1, 1993.⁵

The County does not charge any tipping fee, but will not accept tires or stumps. The site is supervised by an employee of the Callao Grader Service.⁶

Concerns:

Over the past few years Westmoreland County has seen a significant increase in the waste stream entering the landfill. According to a landfill inspection by Culpeper Engineering, during the six month period from May to November 1990 the amount of waste entering the landfill was thirty-five percent (35%) higher than for a similar period of time a year earlier.⁷ Additionally, the inspection indicated a per capita waste stream forty percent (40%) greater than that predicted by the U.S. E.P.A.⁸ (see section VII). This is in contrast to the Tri-County landfill at Lara which has an estimated per capita waste stream nearly identical to that predicted in the E.P.A. study.

One explanation for this dramatic increase in waste stream, is that as counties to the north and west of Westmoreland have charged increasing amounts for garbage disposal, Westmoreland County continues to provide free disposal at "greenbox" sites and at the landfill. Traveling southeast from the more urbanized counties surrounding Fredricksburg and Washington D.C., Westmoreland is the first county to provide free garbage disposal. It is possible that the Westmoreland County Landfill (and collection boxes) are being used by citizens of other counties.

Collection

Counties

Lancaster County

Browning-Ferris Industries (BFI) maintains six unmanned "greenbox" sites for the County of Lancaster. These include two at schools, one at the correctional facility, and three for general public use (map 3). BFI provides the containers and services them three times per week, hauling the refuse to the Tri-County Landfill at Lara.⁹

Northumberland County

Northumberland County has twenty-one unmanned "greenbox" collection sites situated throughout the County (map 1). These include four at schools and seventeen for general public use. BFI provides containers and services them three times a week. All refuse is taken to the Tri-County landfill at Lara.¹⁰

Richmond County

Richmond County also contracts with BFI for the rental and maintenance of refuse containers. The County has seventeen "greenbox" sites including three at schools and fourteen throughout the county for general public use (map 2). BFI transports all refuse to the Tri-County landfill.¹¹

Westmoreland County

Westmoreland County maintains six refuse collection sites throughout the County. Five are unmanned "greenbox" sites, owned and maintained by the County (map 4). The site at Monroe Hall is a manned drop off site, with hours of operation from 7:00 AM to 7:00 PM seven days per week. Westmoreland County contracts with a local trucking firm to have refuse hauled from each of these sites to the Westmoreland County landfill.¹²

TABLE 7.1
NORTHUMBERLAND COUNTY
"GREENBOX" SITES

Site Number	Number of Containers	Area owned by the County (acres)
1	2	NA
2	9	7
3	2	NA
4	2	NA
5	1	NA
6	6	NA
7	8	NA
8	2	NA
9	1	NA
10	7	NA
11	4	NA
12	9	NA
13	1	NA
14	4	NA
15	5	NA
16	2	NA
17	10	NA
18	4	4
19	8	NA
20	2	10
21	6	NA

Source: Northumberland County Staff.

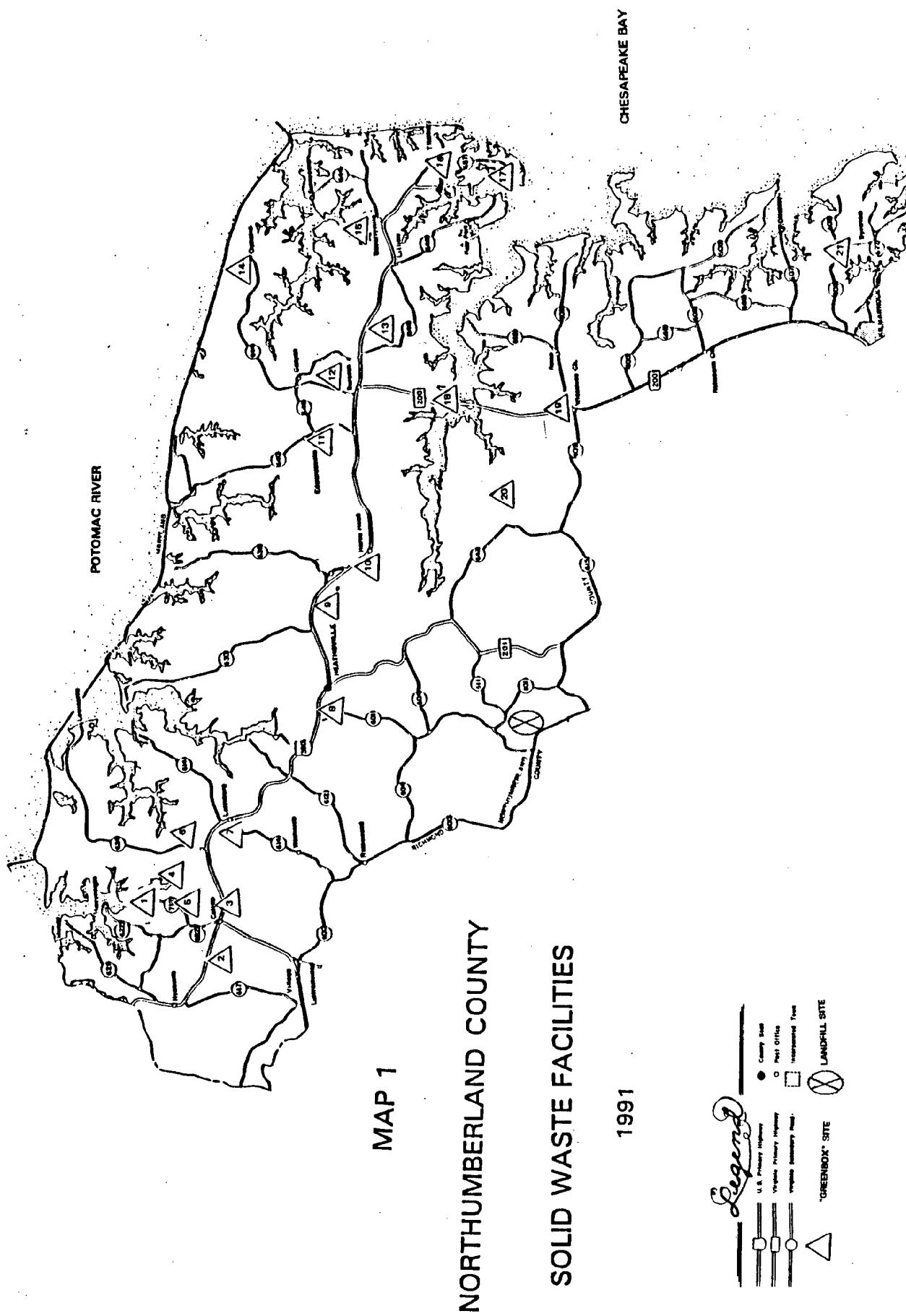


TABLE 7.2
 RICHMOND COUNTY
 "GREENBOX" SITES

Site Number	Number of Containers	Area leased by the County (acres)
1	3	.25
2	3	.25
3	5	.25
4	4	.25
5	3	.25
6	9	.25
7	4	.25
8	2	.25
9	2	.25
10	2	.25
11	4	.25
12	2	.25
13	2	.25
14	9	.25

Source: Richmond County Staff.

MAP 2

RICHMOND COUNTY

SOLID WASTE FACILITIES

1991

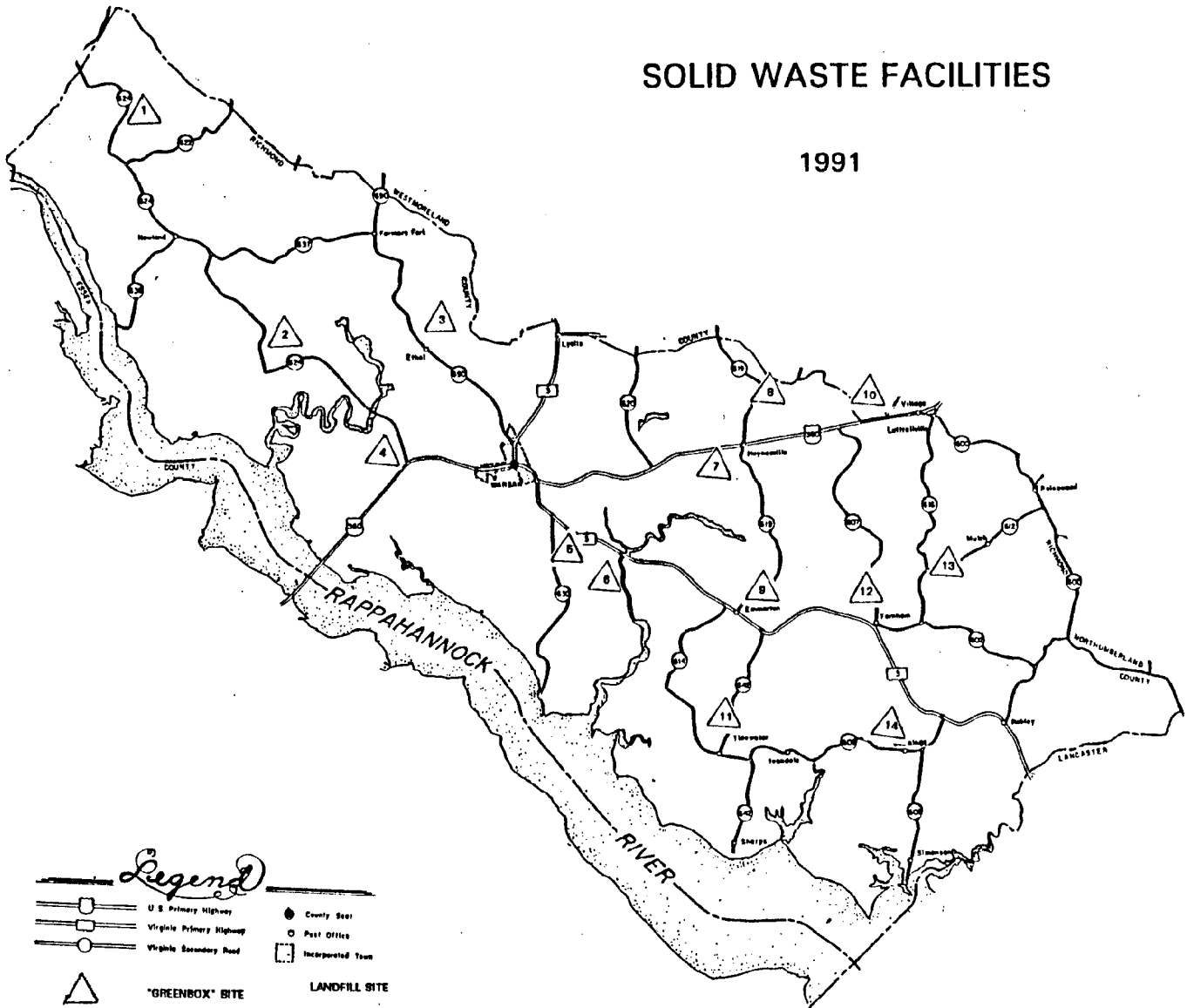


TABLE 7.3
LANCASTER COUNTY
"GREENBOX" SITES

Site Number	Number of Containers	Area owned by the County (acres)
1	10	
2	10	
3	40	

Source: Lancaster County Staff.

TABLE 7.4
WESTMORELAND COUNTY
"GREENBOX" SITES

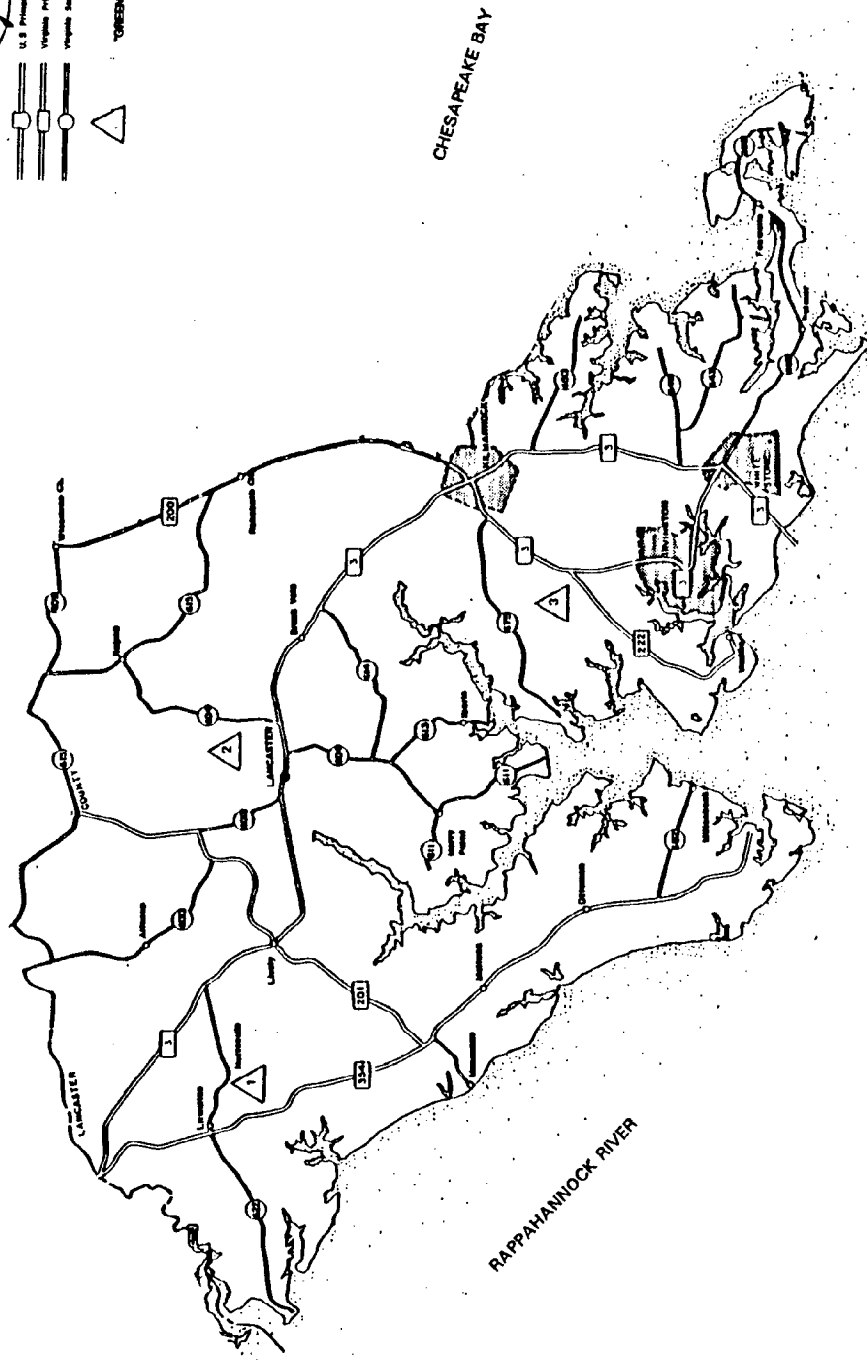
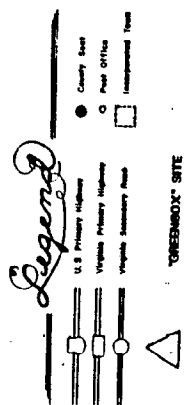
Site Number	Number of Containers	Area owned by the County (acres)
1	5	2.0
2	4	0.5
3	2	Landfill Site
4		1.0
5		2.0
6		4.0
7		0.5

Source: Westmoreland County Staff.

MAP 3

LANCASTER COUNTY SOLID WASTE FACILITIES

1991

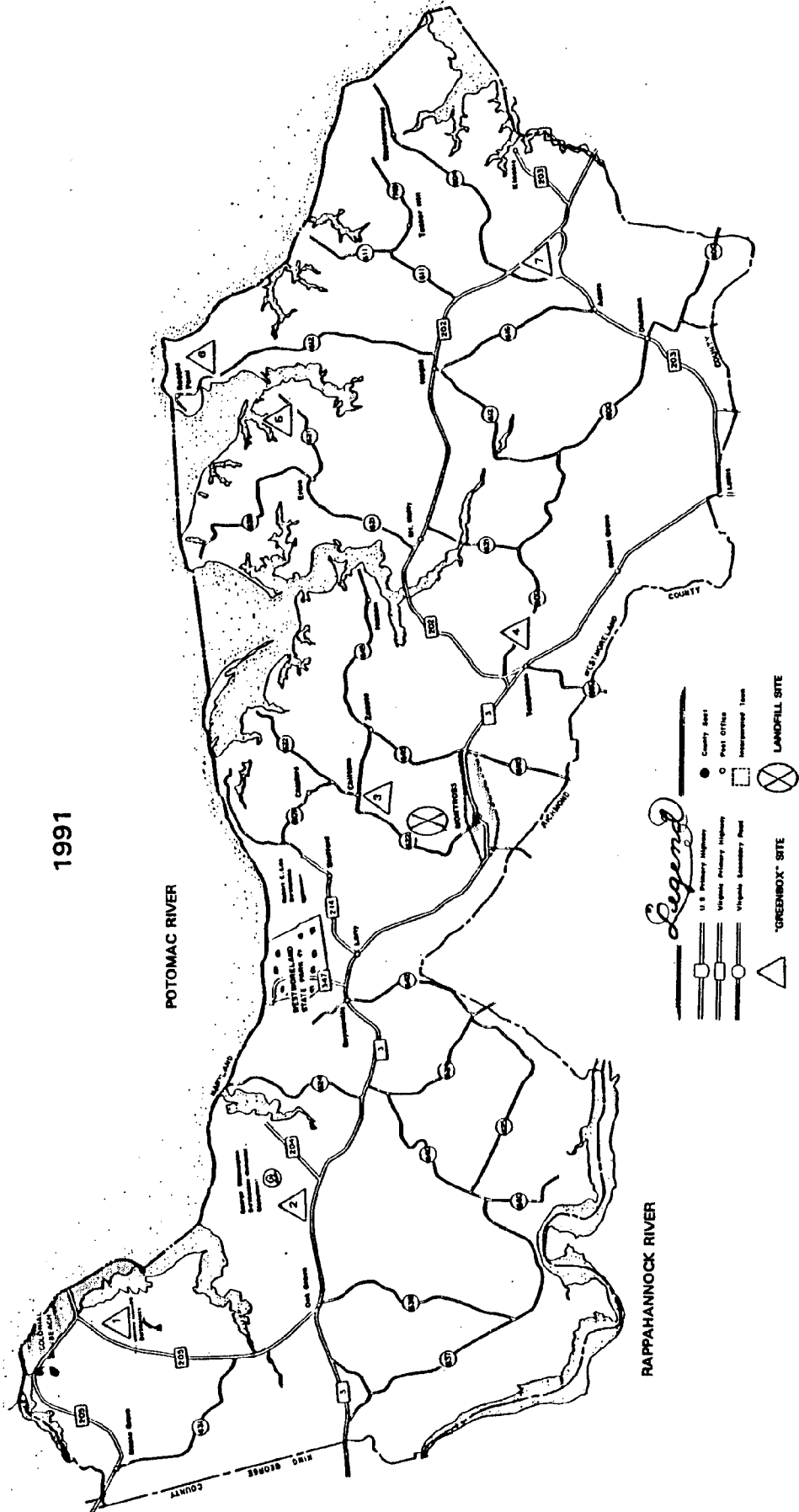


MAP 4

WESTMORELAND COUNTY

SOLID WASTE FACILITIES

1991



Towns

Warsaw

The Town of Warsaw provides twice-weekly curbside pickup for its residential and commercial citizens. There are no additional charges for the service. The Town owns two twenty-seven (27) cubic yard trucks, only one of which is actively used. The refuse is hauled to the Tri-County Landfill.¹³

Montross

The Town of Montross contracts with Doggett Disposal Systems, Inc. to provide curbside pickup twice per week. Refuse is picked up from both residences and businesses. A charge for the service is added to the Town water bill. Refuse is hauled to the Westmoreland County Landfill.¹⁴

Colonial Beach

Commercial waste is picked up twice per week by the Town for a cost of twenty-five dollars or more per month. Residential refuse is picked up weekly. The Town includes a fee for this service in residential water and sewer bills. In addition to the regular collection, the Town offers a separate residential pick-up for "special trash" such as small brush and boxes. The Town owns two dump trucks and a barrel truck and employs four people in refuse collection.¹⁶

Kilmarnock

The Town of Kilmarnock offers curbside pick-up to its residences, with an option of one, two or three weekly pick-ups. Waste is also collected from commercial establishments. Residences and businesses are billed based upon the number of pick-ups per week. The Town owns one truck and employs two people for refuse collection.

Irvington and Whitestone

The Towns of Irvington and Whitestone do not provide any solid waste pick-up to citizens. Many businesses and residences are serviced by private haulers.

Private Haulers

Several private refuse haulers operate in the four counties of the Northern Neck. They service over one thousand, one hundred and fifty (1,150) residential and three hundred and thirty (330) commercial clients.¹⁷ They haul refuse to the appropriate landfill (Westmoreland County's refuse is taken to the Westmoreland County Landfill, refuse from the other three Counties is taken to the Tri-County Landfill). They are not charged a tipping fee at either landfill.

Recycling

Until recently, recycling on the Northern Neck has been limited to a small amount of specific materials recycled by some of the larger commercial and industrial companies. This included such items as copper, recycled by the power companies, and cardboard, recycled by the larger retail stores. In addition to this, Reynolds Aluminum has been collecting aluminum from area residents in Kilmarnock. In the past, there have also been a few small businesses which have accepted specific materials (glass for instance).

In the last year, however, new efforts by businesses, citizens groups and local government have greatly increased the volume of materials being recycled. These efforts have, in a short time, managed to recycle an estimated four percent (4%) of the waste stream (see Section VI). Though this is short of the mandated ten percent (10%) goal the rate at which these efforts are collecting recyclables is continuing to grow.

Private Businesses

The largest private recycling firm on the Northern Neck is J. R. Dinsmore Enterprises of Warsaw, Va. Dinsmore Enterprises has been involved in general salvage for more than twelve years. In March of 1991 under the name of "Northern Neck Recyclables" they began accepting a wide variety of recyclable materials. These include: glass, aluminum, bi-metal cans, plastic (PET and HDPE), paper, motor oil, appliances, and scrap iron.

In addition to the facility located in Warsaw, Dinsmore Enterprises has been accepting recyclables at "Recycling Days" in various locations in Westmoreland and Richmond Counties. Materials are transported to different purchasing industries throughout eastern Virginia.¹⁸

Another important private recycling firm in the Northern Neck is Reynolds Aluminum. Reynolds collects aluminum in Kilmarnock, and draws a significant amount from both Lancaster and Northumberland Counties.

Nonprofit Community Groups

The Northern Neck Recycling Task Force (NNRTF) was formed in the Fall of 1990 with the objective of encouraging recycling in the Northern Neck. In January of 1991 the NNRTF began collecting newspaper at sites in Lancaster and Northumberland Counties. In

the last six months the NNRTF has collected newspaper, glass, and bi-metal cans.

The NNRTF has conducted several public education programs, including a public mailing and an Earth Day celebration. In February of 1991 the NNRTF assisted the Northern Neck Planning District Commission by conducting a week-long survey of refuse entering the Tri-County landfill at Lara. Another survey is planned for July of 1991.¹⁹

Richmond County has had several citizen's groups active in recycling. The Richmond County Anti-Litter Council, a county-wide committee with a paid coordinator, has provided recycling education and has publicized recycling opportunities for the past five years. The Veterans of Foreign Wars (VFW) Auxiliary has provided regular bi-monthly "Recycling Days" for the past four years in Warsaw. This effort has recently been discontinued, as the Town of Warsaw has begun providing monthly "Recycling Days" at the Town Office.²⁰

In Westmoreland County, Westmoreland War On Waste (WWOW) has been active for several years with educational programs. WWOW also began monthly "Recycling Days" which have become a county government sponsored program.²¹

Local Governments

Lancaster County

The County of Lancaster and its three towns (Kilmarnock, White Stone and Irvington) have had no official recycling program. The County has been supportive of the Northern Neck Recycling Task Force, who, along with Reynolds Aluminum, has been responsible for most of the recycling in the County.

Northumberland County

Northumberland County presently has no official recycling program. The County has been supportive of the Northern Neck Recycling Task Force, which operates a collection center in Burgess. Many citizens of Northumberland County also take their recyclables to the J. R. Dinsmore Enterprises facility in Warsaw.

Richmond County

Richmond County does not have an official recycling program. Richmond County citizens have taken advantage of J. R. Dinsmore

Enterprises which is located in Warsaw, the county seat.

Westmoreland County

In 1989, Westmoreland County War on Waste began a program of monthly "Recycling Days". In April of 1990 the program was taken over by the County and is now held at the County office building in Montross. On the second Friday of each month, citizens are encouraged to bring recyclables to Montross, where they are collected and hauled off by a private firm (J. R. Dinsmore Enterprises). The program has been very successful. The County has recently begun another monthly "Recycling Day" at Carmel Church, located at the southern end of the County.²²

Warsaw

Warsaw has recently begun a cooperative effort with J. R. Dinsmore Enterprises to hold monthly "Recycling Days". The first was held in May of 1991.

Colonial Beach

The Town of Colonial Beach also began monthly "Recycling Days" in May. The recyclables are taken by J. R. Dinsmore Enterprises.

Notes

1. Northumberland County Staff.
2. Ibid.
3. Northern Neck Recycling Task Force, Landfill Survey Committee. "Solid Waste Survey". Unpublished study. February 1991.
4. Culpeper Engineering. "Tri-County Landfill Volume Report". Unpublished study. 1991.
5. Westmoreland County Staff.
6. Ibid.
7. Culpeper Engineering. 1991
8. United States Environmental Protection Agency. Characteristics of Municipal Solid Waste in the United States: 1990 Update. 1990.
9. Lancaster County Staff.
10. Northumberland County Staff.
11. Richmond County Staff.
12. Westmoreland County Staff.
13. Town of Warsaw Staff.
14. Town of Montross Staff.
15. Town of Colonial Beach Staff.
16. Town of Kilmarnock Staff.
17. Interviews with refuse disposal companies.
18. Dinsmore, J. R. - J. R. Dinsmore Enterprises.
19. Northern Neck Recycling Task Force. Correspondence. June 1991.
20. Richmond County Staff.
21. Westmoreland County Staff. Correspondence. June 1991.
22. Westmoreland County Staff.

Section VIII

Future Waste Disposal Systems

Future Waste Disposal Systems

Funding

Presently, the Counties of the Northern Neck fund their waste management programs out of general funds. Anticipating the costs involved with new landfill cells and with implementing other new State regulations, the Counties have set aside reserve funds over the past few years. These will help to defray some of the capital costs associated with new programs. Additionally, several of the Counties have raised taxes, or anticipate a rise in taxes, to pay for these new waste management programs.

Some Counties are also considering charging tipping fees at the landfill or transfer station to offset waste management costs. As most of these new costs will be incurred because of State regulations and mandates, the localities of the Northern Neck also look to the Commonwealth of Virginia to provide funding.

Future System Plan

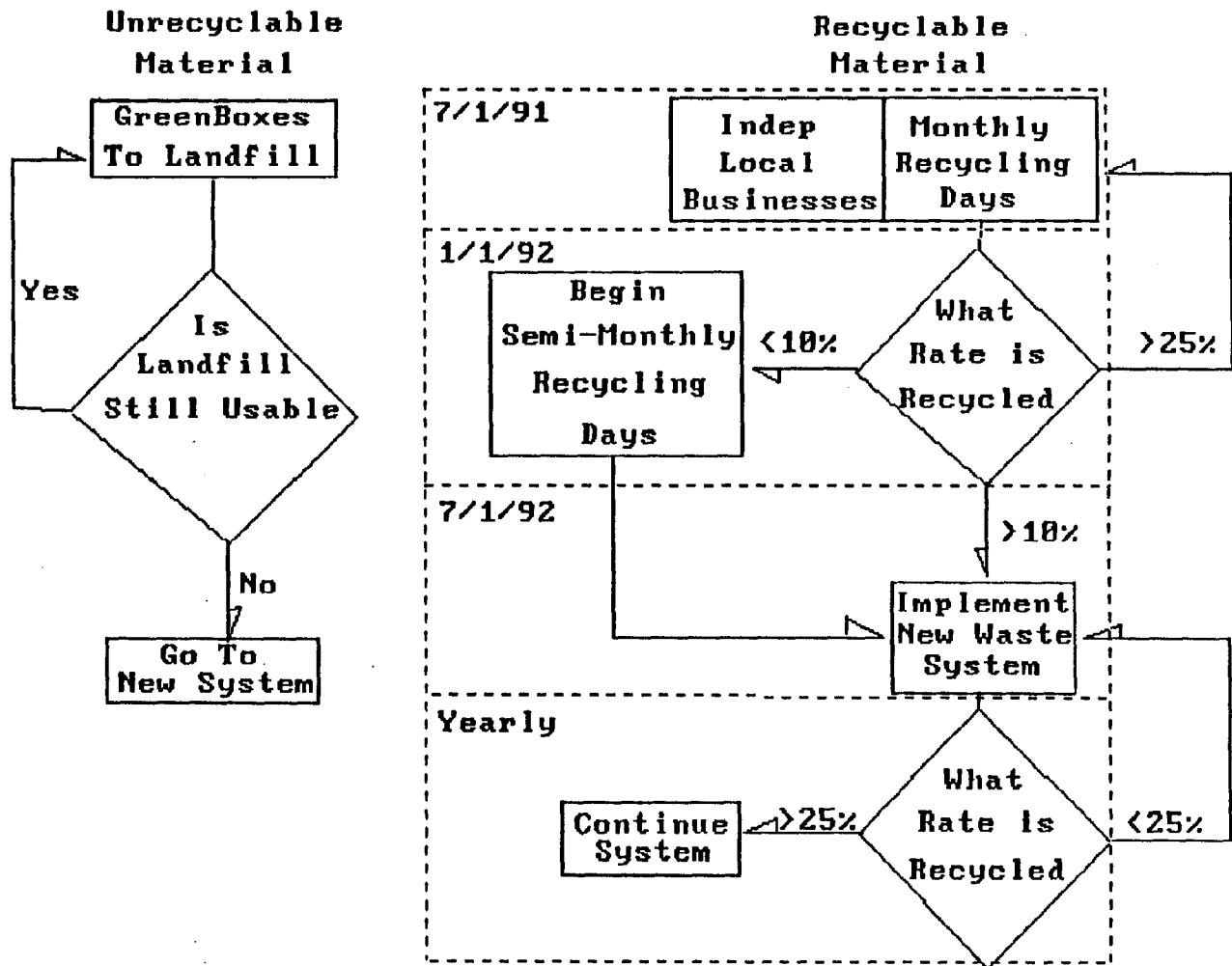
There are many obstacles to establishing a detailed twenty (20) year plan that the localities of Northern Neck will be able to adopt. With the establishment of new State regulations and the beginning of new recycling programs in the last year, it will be several months before enough is known about existing conditions to decide upon the most effective and economical course of action for the future.

For this reason, the discussion of the future waste disposal systems has been divided into two sections: the short term plan (the next twelve months) and the long term plan (through the turn of the century). Figure 8.1 outlines the decision making process for the next year (July 1991 through June 1992). During that period the localities of the Northern Neck will evaluate the newly established recycling programs and secure plans for the long term waste management system.

Short Term Plan

For the first six months the solid waste and recycling programs will continue as they are now (see section VII). Solid waste will be collected through a "greenbox" system by the Counties, and through curbside pick-up by the Towns and private

Figure 8.1: Short Term Planning Process



haulers. Lancaster, Northumberland, and Richmond Counties will continue to use the last cell of the Tri-County Landfill at Lara, and Westmoreland County will continue to use the third cell at the Westmoreland County Landfill.

Recyclables will be collected by the existing citizens groups in Northumberland and Lancaster Counties. Richmond and Westmoreland Counties will continue to depend on private recycling companies and "Recycling Days".

At the end of the first six month period (December, 1991) an evaluation will be made as to whether the existing system is performing satisfactorily. The system will be studied to determine answers to the following questions:

1. Are there problems with the existing system of collection that make changes necessary?
2. Are the recycling targets being met?
3. Will the existing system be able to meet the eventual twenty-five (25%) percent mandate?
4. How will the landfill cells scheduled for closure be replaced?

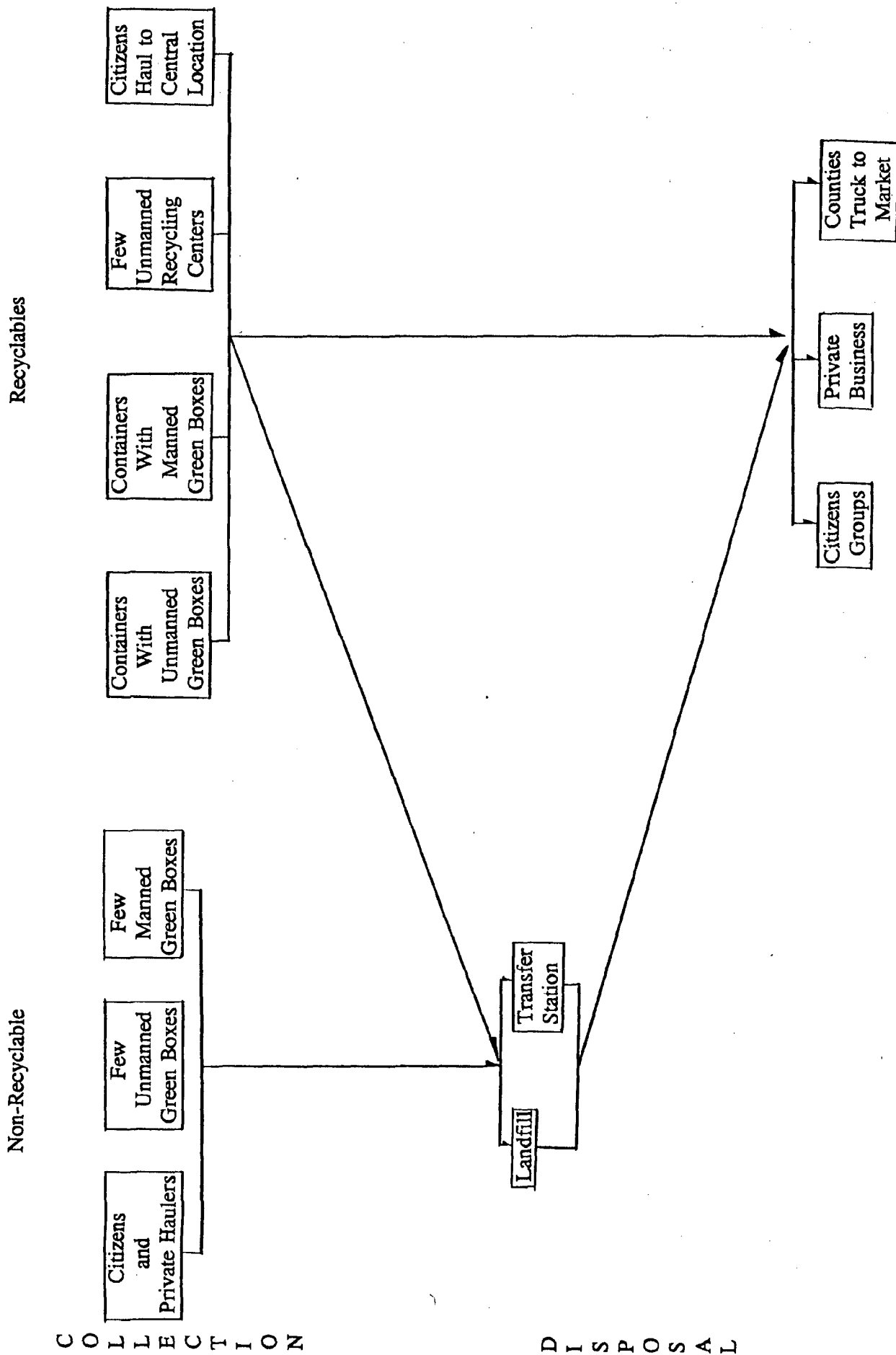
In January of 1992 decisions will be made by each of the localities of the Northern Neck as to the design of long term waste disposal and recycling systems and the plan will be updated. Figure 8.1 outlines the possible components of these long term systems.

Potential System Components

The following discussion of potential waste systems for the localities of the Northern Neck has been divided into four separate subsystems. The options for the collection of non-recyclable materials, the collection of recyclable materials, the disposal of nonrecyclable materials, and the transport of recyclable materials to market have each been considered separately so as to maximize planning flexibility. It is understood that certain options in one subsystem will influence the feasibility of options in other subsystems, and this will be addressed in the discussion. For the purpose of this section, however, the assumption has been made that any combination of subsystem options is technically feasible and will not be ruled

Figure 8.2

Disposal System Options



out. This will insure that all possible system configurations have been considered before commitment is made to a specific set of options.

This flexibility is especially important, because it is unlikely that the same set of options will be the best choice for all the localities of the Northern Neck. The following section provides a wide range of options that will allow each locality to choose a long term system suited to its unique situation.

1. Collection of Non-Recyclable Material

Option 1A: Direct Transport by Citizens, Towns and Private Haulers to the Landfill or Transfer Station

Physical Description:

The county government would no longer provide any kind of "greenbox" or drop-off sites. All refuse would be taken to the landfill site or transfer station for transport out of the region. Towns and private haulers would continue to haul directly to the landfill/transfer station.

Cost Analysis:

This option would add no additional cost to that required for the construction of a landfill or transfer station, other than an expanded parking area.

Advantages:

The most obvious advantage to this option is the cost savings for the county government. Additionally, the county would be avoiding many of the problems associated with unmanned "greenbox" sites.

Disadvantages:

The greatest disadvantage would be a significant inconvenience to residents. Depending on the location of the landfill/transfer station, residents might have to travel as far as thirty (30) miles to dispose of their refuse. Some of the

inconvenience could be avoided by the more affluent sector of the population, by contracting with private haulers. It is still likely, though, that this option will result in illegal dumping by residents unable, or unwilling to transport their refuse to the landfill/transfer station.

Option 1B: Collection of Refuse at Centrally Located Unmanned
 "Greenbox" sites

Physical Description:

The County would maintain several (2-5) unmanned collection sites situated at central points throughout the county. Refuse would be hauled by contractor to the landfill or transfer station.

Cost Analysis:¹

Capital Costs (per site)

Land Acquisition (1 acre @ 1,000/acre)	\$ 1,000
Site Preparation	\$ 8,200
10 Dumpsters (@ \$600/Dumpster)	\$ 6,000
Total	\$15,200

Annual Operating Costs (per site)

Transportation	\$30,000
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Advantages:

The advantage to this option is that it provides a compromise between cost to the County government and convenience for the county citizens. Refuse containers could be located at central "cross-road" areas through which most citizens often pass.

Disadvantages:

Unmanned refuse sites present several problems. If the county chooses to adopt a mandatory recycling program, there would be no way to inspect incoming refuse to insure compliance. In addition unmanned sites are notorious for problems with litter and vandalism.

Option 1C: Several Manned Drop-off Centers

Physical Description:

The County would establish several (2-5) refuse collection sites. The sites would have regular hours of operation, and would be staffed by county employees. Employees would insure only those materials accepted into the county landfill/transfer station would be placed into the refuse containers. The employee would also insure that only residents of the County use the site.

The site would consist of a fenced area with a gate which would be locked when the site was closed, refuse boxes, shelter and rest room facilities for the County Employee. The area would be paved or graveled.

Cost Analysis:²

Capital Costs (per site)

Land Acquisition (1 acre @ 1,000/acre)	\$ 1,000
Site Preparation	\$ 8,200
Small Building for Staff Shelter	\$ 500
Utility Installation	\$ 500
10 Dumpsters (@ \$600/Dumpster)	\$ 6,000
Fencing	\$ 5,000
Total	\$21,200

Annual Operating Costs (per site)

Personnel (2 employees, 30 hrs/week, \$5.00/Hr.)	\$15,600
Transportation	\$30,000
Telephone & Electricity	\$ 1,100
Portable Toilet Rental	\$ 600
Insurance	\$ 250
Total	\$47,550

Advantages:

Manned refuse centers provide relatively convenient refuse disposal for citizens, while allowing County governments to control the types of materials that enter the waste stream. The presence of County staff will also help to keep sites clean and attractive, and to minimize vandalism.

These sites may also be convenient sites for collection of recyclable materials (see recycling options below).

Disadvantages:

The greatest disadvantage to this option is the cost. The addition of extra employees and infrastructure will increase the cost of refuse collection.

2. Collection of Recyclable Materials

Option 2A.: Containers at Unmanned "Greenbox" Sites

Physical Description:

Recyclable materials could be collected at areas already designed to collect waste i.e. "The Green Box Sites." Approximately two acres of land would be needed for this type of collection site. The non-recyclable area would be designated with signs and materials would be collected in the "Green boxes". In an area adjacent to the "Green Boxes", and distinctly marked with signs designating it the "RECYCLING AREA", roll off containers would be set up. Signs would be posted defining the type of materials to be stored in individual containers. Citizens would be responsible for separating their own waste and transporting it to the site and making sure that the recyclable materials are placed in the proper containers.

Collectable Materials:

Newspapers
Cardboard
Aluminum
Glass
Plastic

Costs:³

Capital Costs (per site)

Land (approximately 2 acres @ \$1000/acre)	\$ 2,000
3 uncovered rolloff containers	\$17,000
1 replacement uncovered rolloff container	\$ 6,000
2 covered rolloff containers	\$12,000
Signs	\$ 400
Total	\$37,400

Annual Operating Costs (per site)
Transportation

\$10,000

Advantages:

There are a number of advantages to this system. First of all, there could be a few of these sites located in various areas in the county. Since recycling sites would be easily accessible to the citizens, residents may be more inclined to recycle. Secondly, since the site would be unmanned, the localities would save the cost of salary (\$15,000 annually) and facilities (small structure and portable toilet (\$1,000) required to man a site.

Disadvantages:

Although some localities have been successful with unmanned sites, a large number of localities report that unmanned recycling sites do not work. Recyclables are likely to be placed in the wrong container. When recycling materials become contaminated buyers will either decrease the return price on recyclables or refuse to accept the materials at all.

Option 2B: Recycling Containers at Manned "Green Box" Sites

Physical Description:

Containers for recyclable materials would be placed at already existing "Green Box" Sites. Approximately 2 acres of land would be needed for this type of collection site. The non-recyclable materials would be collected in the "Green boxes". The non-recyclable material area would be designated with signs. The recycling containers would be in an area adjacent to the "Green Boxes", and distinctly marked with signs designating it the "RECYCLING AREA". Signs defining the type of materials to be stored in individual containers would be posted. Citizens would be responsible for separating their own waste, transporting it to the site and making sure that the recyclable materials are placed in the proper containers. An attendant would be on duty during working hours to inspect and insure that the waste was being placed in accordance with posted rule. There would be a small housing structure and facilities for the attendant. Also an information bulletin board would be set up to post information about recycling such as disposal areas for specified waste products that are not handled at this site.

The entire facility will be enclosed within a chain link

fence and will provide ample space for automobiles to drive up to the containers.

Collectable Materials:

Newspapers
Cardboard
Aluminum
Glass
Plastic

Costs:⁴

Capital Costs (per site)

Land (approximately 2 acres @ \$1000/acre)	\$ 2,000
Attendants housing structure	\$ 500
Utility installation	\$ 500
3 uncovered rolloff containers	\$17,000
1 replacement uncovered rolloff container	\$ 6,000
2 covered rolloff containers	\$12,000
Signs	\$ 400
Total	\$38,400

Annual Operating Costs (per site)

Personnel (two part-time attendants)	\$15,600
Telephone and electricity	\$ 40
Portable toilet rental	\$ 300
Insurance	\$ 250
Transportation costs	\$10,000
Total	\$26,190

Advantages:

There are a number of advantages to this system. First of all, there could be one or two sites located in the county. Consequently, recycling sites would be accessible to the citizens. Secondly, the site would be manned and therefore contamination of recycling materials could be curtailed. The attendant would also be responsible for keeping the area neat, and answering recycling questions.

Disadvantages:

The main disadvantage to this site is the cost associated with manning a site. Additionally, the county will be responsible for any administrative work associated with hiring and managing this personnel.

Option 2C: Strategically Placed Unmanned Recycling Areas

Containers for recyclable materials could be placed at various sites in a county. The most likely candidates to be considered as an unmanned recycling drop off area would be shopping centers, schools etc. About one-half of an acre would be needed for this type of collection site. The "recycling" signs would be posted to identify the area. Also the recycling containers would have signs defining the type of materials to be stored in individual containers. Citizens would be responsible for separating their own recycling materials and transporting it to the site and making sure that the recyclable materials are placed in the proper containers.

Collectable Materials:

Newspapers
Cardboard
Aluminum
Glass
Plastic

Costs:⁵

Capital Costs (per site)

Land (see advantages*)	
3 uncovered rolloff containers	\$17,000
1 replacement uncovered rolloff container	\$ 6,000
2 covered rolloff containers	\$12,000
Signs	\$ 300
	Total
	\$35,300

Annual Operating Costs (per site)

Transportation costs	\$10,000
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Advantages:

There are a number of advantages to this system. First of all, a few of these sites could be located in various areas in the county. Since recycling facilities would be easily accessible to the citizens, residents may be more inclined to recycle. It is also possible that costs of this site could be limited to operating costs. Merchants at shopping facilities may view the recycling boxes as a vehicle to attract more businesses and allow recycling containers to be placed there free of charge.

Disadvantages:

Although some localities have been successful with unmanned sites, a large number of localities report that unmanned recycling sites do not work. Recyclables are likely to be placed in the wrong container. But more importantly, when recycling materials become contaminated buyers will either decrease the return price on recyclables or refuse to accept the materials at all. Also if citizens do not place disposal materials in containers, the relationship between the county and merchants could suffer.

Option 2D: Citizens and Private Haulers
 Transport Waste to Central Location

Description

One scenario under this option would be for private haulers and citizens to transport their recyclables to a central location such as a landfill or a transfer station. Approximately 1/2 acre of land would be used at the landfill or transfer station for the collection of recyclables. The materials would be collected in a designated area indicated by signs. The recycling containers would be in an area separate from the non-recyclable waste. Signs designating "Recycling Area" and "Non-Recycling area" would be posted. Signs defining the type of materials to be stored in individual containers would be posted. Citizens would be responsible for separating their own waste, transporting it to the site and making sure that the recyclable materials are placed in the proper containers. Personnel attending the landfill or transfer station could inspect and insure that the waste was being placed in accordance with posted rules.

The second scenario would be for citizens and private haulers to drop off their recyclable materials at various privately owned recycling businesses in the county.

Collectable Materials:

Newspapers
Cardboard
Aluminum
Glass
Plastic
White goods
Woody materials - trees, limbs, etc.

Costs (Scenario One):⁶

Capital Costs (per site)

Land (approximately 2 acres @ \$1000/acre)	\$ 2,000
Housing structure for attendant	\$ 500
Utility installation	\$ 500
3 uncovered rolloff containers	\$17,000
1 replacement uncovered rolloff container	\$ 6,000
2 covered rolloff containers	\$12,000
Signs	\$ 400
Total	\$38,400

Annual Operating Costs (per site)

Personnel (two part-time attendants)	\$15,600
Telephone and electricity	\$ 40
Portable toilet rental	\$ 300
Insurance	\$ 250
Transportation costs	\$10,000
Total	\$26,190

Advantages:

There are a number of advantages to the first scenario. First of all, the transfer station or landfill will already be manned with personnel to manage the area. Secondly, since the site would be manned contamination of recycling materials could be curtailed. The personnel would also be responsible for keeping the area neat, and answering questions regarding recycling.

The second scenario suggests citizens and private haulers take their recyclables to privately owned recycling businesses. This option encourages the development or expansion of businesses in an area that is economically disadvantaged. Private individuals can utilize new regulations as an opportunity to begin or expand a business in recycling or hauling.

Disadvantages:

Under the first scenario citizens haul recyclables to a central location such as the landfill or transfer station. The main disadvantage to this plan is that there would be one location for citizens to take their recyclables and other waste. This may promote more illegal dumping and litter in the region.

Under the second scenario citizens would be responsible for taking recyclables to private recycling businesses. The main disadvantage is citizens may not recycle because they may find transporting the recyclables not worth the effort.

3. Disposal of Non-Recyclable Materials

The landfill cells presently in use at both the Westmoreland County Landfill and the Tri-County Landfill must be closed by January of 1994. Refuse landfilled after that time must be disposed of in landfills that meet the new State regulations. Westmoreland County has already decided to develop a new cell at the existing landfill site in accordance with the regulations. The other three Counties have the option of developing a new landfill or transporting their refuse to a landfill in another locality.

Option 3A: Construction of a New Landfill

Physical Description:

The County of Northumberland recently purchased a two hundred and forty (240 acre) site for the purpose of developing a new landfill. The landfill would be operated by the three counties that presently operate the Tri-County landfill. The landfill would be operated in much the same way as the existing landfill, with the possible addition of a recyclable materials collection center.

Cost Analysis:⁷

Capital Costs	
Site Preparation and	
Construction of First Cell	\$1,441,849
Subsequent Cells	\$1,843,496

Annual Operating Costs	\$ 470,849
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Equivalent "Tipping Fee"

1992	\$43.88/Ton
1995	\$46.94/Ton
2000	\$63.67/Ton
2005	\$77.47/Ton
2010	\$96.24/Ton

Advantages:

An advantage to disposing of the refuse in a local landfill

is the reduction in transportation costs associated with transporting of wastes to another region. The Counties would also have control over the landfill. Depending on a landfill operated by another locality or private business would leave the three counties vulnerable to unexpected increases in tipping fees, or even having no place to dispose of refuse. As long as the local landfill operates within state regulations the three Counties would always have a means of disposing of their refuse.

Disadvantage:

The greatest disadvantage, along with the considerable cost of developing a landfill, is the responsibility of long term maintenance. New state regulations require monitoring of landfill seepage long after the landfill has been closed. Additionally, any toxic or hazardous wastes that find their way into the landfill would be the Counties responsibility to clean up.

Option 3B: Transporting of Materials Outside the Region From a Central Transfer Station

Physical Description:

A central location would be chosen for a central transfer station. The station would receive refuse from County and Town collection vehicles, private haulers and citizens. The refuse would be loaded into large capacity trucks and hauled out of the area to one of the large regional landfills being developed in eastern Virginia. Due to the relatively small amount of waste and the proximity of regional landfills, no compaction would probably be required.

Cost Analysis:⁸

Capital Costs	\$925,000
Annual Costs	\$180,000
Cost per Ton (1992)	\$55/Ton

Advantages:

The primary advantage to the Counties of this option is that once refuse has been accepted by a regional landfill the counties no longer have any responsibility for it. Changes in State regulations, closure and long term monitoring all become the responsibility of the landfill operator. For rural counties with small staffs, this is a significant advantage.

Disadvantages:

If the counties become dependent on a regional landfill, they will have no control over tipping fees or the operation of the landfill. If a violation of State regulations or mismanagement causes the landfill to close, the Counties may be left with no place to take their refuse.

4. Transportation of Recyclable Materials to Market

Once recyclable materials have been collected they must be transported to a recycling dealer or industrial user. This can be done by non-profit citizen's groups, private businesses, or by the County governments themselves.

Option 4A: Non-profit Citizens Groups

Physical Description:

Citizens' groups would either collect recyclable materials on their own or obtain them from the county's collection system. They would be responsible for transporting the materials to market, and in exchange would keep whatever profit they could get from the sale of the recyclables.

Cost Analysis:

There would be no cost to the local governments.

Advantages:

Local governments would be relieved of the responsibility of evaluating markets and negotiating prices. Most of the material handling would be performed by volunteer labor, reducing costs to tax-payers.

Disadvantage:

Citizens' groups would be unlikely to be able to handle the volume of material necessary to reach the mandated targets. Citizens' groups would also be dependent on receiving a profitable return on transportation expenses. If prices for materials dropped or transportation costs rose, volunteer groups would be unable to continue this operation.

Option 4B: Private Businesses

Physical Description:

Several scenarios would involve private businesses transporting and marketing recyclable materials. Private

of sludge on the Northern Neck is small relative to the total waste stream, it is likely to grow. The counties of the Northern Neck periodically accept the land application of waste from outside the region. All four counties have abundant agricultural land, most of which is well removed from urbanized areas, making it ideal for this purpose.

Septic Tank Sludge

Existing Situation:

The population of the Northern Neck depends primarily on on-site disposal systems for the treatment of liquid waste. According to the Virginia Water Project seventy-two percent (72%) of the households on the Northern Neck have septic tanks.⁵ There are probably well over thirteen thousand (13,000) septic tanks on the Northern Neck. The septage from these tanks is handled by private businesses which dispose of it in private lagoons and, to a small extent, in municipal sewage treatment plants.

If septic tanks are pumped out every three to five years, as is recommended, these tanks would be producing on the order of 2.5 million gallons annually. The existing system of disposal would never be able to handle this volume, but since most homeowners do not pump their tanks regularly, it has not needed to.

This situation will probably change due to the regulations of the Chesapeake Bay Preservation Act. Under these regulations the Counties of Tidewater Virginia must require that citizens pump their septic tanks every five years. The first group of homeowners will be required to have their tanks pumped by 1993. Though private industry is attempting to expand its capacity, the increased septage disposal requirements may be beyond the capabilities of the present system.

Plan:

The localities of the Northern Neck, possibly through the Northern Neck Planning District Commission, will work with State agencies to investigate innovative solutions to the septage disposal problems. These may include modifications to existing sewage treatment plants and the composting of septage combined with other organic material.

Agricultural Wastes

Existing Situation:

The agricultural economy of the Northern Neck primarily revolves around the production of row crops. A significant waste problem in row crop operations is the safe disposal of agricultural chemicals. A survey conducted by the Virginia Farm Bureau in 1989 showed that many farm operators in the Northern Neck were storing banned or otherwise unusable pesticides because they had no safe means of disposal.

In June of 1990, Northumberland County was one of three counties to participate in a pilot project to dispose of these hazardous chemicals. The project, known as "Farmers Clean Days" was a cooperative effort of the Virginia Department of Agriculture and Consumer Affairs, the Virginia Polytechnic Institute Cooperative Extension Service, the Virginia Department of Waste Management, the Division of Consolidated Laboratory Services, and local government. It was designed to be the first phase of a statewide program to collect and dispose of waste pesticides.

During the single collection day, ten Northumberland farmers brought in 1,479 pounds of unwanted chemicals.⁶ It is probable that farm operators in the other three counties of the Northern Neck have similar amounts of unwanted pesticides, but lack any means of disposing of them.

Plan:

Local governments do not have the expertise to dispose of dangerous agricultural pesticides. The Counties will call for State funding and implementation of phase two of the "Farmers Clean Day" program. This would provide to farmers state-wide, including those in Lancaster, Richmond and Westmoreland Counties, the opportunity to dispose of unwanted chemicals.

Waste Oil

Existing Situation:

There are currently at least thirteen (13) service stations and garages on the Northern Neck that will accept used oil.⁷ They are fairly evenly dispersed throughout the region, making disposal of household motor oil relatively convenient. In addition, facilities for disposal of used oil have been provided at the municipal "recycling days" in Richmond and Westmoreland

Counties. The oil is picked up from service stations and garages on a regular or semi-regular basis by several different oil recycling companies.

Plan:

Though recycling of used oil is relatively convenient in the Northern Neck there is some indication that oil is still disposed of improperly by homeowners. The local governments will work with service stations to publicize the location of oil recycling centers, and the importance of the proper disposal of used oil.

Construction Waste

Existing Situation:

Residential construction is a very important sector of the economy of the Northern Neck. The construction of waterfront vacation and retirement homes has brought a significant number of jobs to this rural region. There are nearly two hundred (200) companies based on the Northern Neck involved in the clearing of land and the building of homes. These companies produce a large quantity of solid waste. A recent survey conducted by the Northern Neck Planning District estimated that these companies produce as much as 20,000 cubic yards of waste annually, not including stumps and yard waste. This consists, primarily of materials associated with residential development: wood, masonry and roofing.⁸

Some of the waste produced is reused by the builders, but most ends up in one of the Northern Neck's two landfills.

Plan:

Local governments will encourage builders to reuse as much materials as possible. They may also investigate the development of a program to assist in the salvaging of usable building material.

Stumps

Existing Situation:

The majority of development on the Northern Neck is taking place on wooded waterfront lots resulting in a large volume of stumps and woody debris. At the present time neither landfill takes this type of material; land-clearing companies must find another avenue of disposal. A large amount of stumps end up in

illegal "stump dumps", often filling environmentally sensitive areas and clogging creeks and ravines.

Plan:

Local governments will explore the purchase, either by the governments or by local businesses, of a chipper large enough to handle this type of waste. The product could be made available to residents as mulch.

Yard Waste

Existing Situation:

At the present time neither of the Northern Neck's two landfills accept yard waste. This has forced private landowners to find other ways of disposing of this waste. In a recent survey, the Westmoreland County Cooperative Extension found that nearly thirty thousand (30,000) pounds of organic material is composted annually in Westmoreland County.⁹ Though this is a very encouraging study, it does not mean that all of the herbaceous and woody waste materials are being disposed of properly.

Plan:

An effort will be made to inform the public about the proper way to compost yard wastes. Localities will also stress the importance of properly disposing of these materials. This will be accomplished either through existing cooperative extension programs or through the recycling education associated with this plan.

Tires

Existing Situation:

Based on a rule of thumb supplied by the Department of Waste Management the average community disposes of one tire per capita per year.¹⁰ That translates to over 44,000 tires per year in the Northern Neck. At this time there is a very limited market for tires to be recycled. Individuals and businesses in the Northern Neck are finding it increasingly difficult to dispose of used tires. Many tires are being stock piled and dumped illegally.

Plan:

The localities of the Northern Neck will support full funding of the Department Waste Management's tire management program. Unless some processing center for used tires is established within a reasonable transporting distance to the Northern Neck, government collection of tires is not advisable.

Batteries

Existing Situation:

Though the Westmoreland County landfill accepts automotive batteries, the Tri-County landfill does not. Most are turned in to the dealer from which a new battery is purchased. Dealers are required by state law to provide for the recycling of old batteries equal to the number of new batteries sold.

In addition, at least one local recycling business accepts used batteries for recycling.

Plan:

Though the majority of automotive batteries will be recycled through battery dealers, provisions will be made by local governments for the recycling of old batteries not covered by state regulation. (That is old batteries that are not being replaced by newly purchased batteries.) Provision for recycling will be provided by the local governments themselves, or by private recycling businesses.

Large Appliances

Existing Situation:

Both landfills presently accept large appliances and contract with scrap metal dealers to have them hauled away.

Plan:

The localities will continue to provide this service to citizens.

Table 9.1: Lancaster County

**Projections of Certain "Special Wastes" in Waste Stream
(Tons/Year)**

	1990	1995	2000	2005	2010
Major Appliances	136	141	147	145	143
Furniture	361	387	446	506	567
Automotive Batteries	80	88	98	109	120
Tires	91	88	94	98	101
Total	668	704	785	858	931

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 9.2: Northumberland County

**Projections of Certain "Special Wastes" in Waste Stream
(Tons/Year)**

	1990	1995	2000	2005	2010
Major Appliances	131	133	136	131	126
Furniture	345	365	412	457	503
Automotive Batteries	77	83	91	98	106
Tires	88	83	86	88	90
Total	641	664	725	774	825

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

businesses could collect and market recyclables, completely removing local government from the process; local governments could contract with private businesses to remove recyclables from the government's collection system; or a private business could be contracted to transport recyclables along with other solid waste from a transfer site. It would be advisable in any scenario that local governments have some type of understanding with the business(es) that all recyclables will be taken, and not just those that offer maximum profit.

Cost Analysis:

As long as the transport and sale of recyclable material is profitable there will be no cost to local government. If the price paid for recyclable materials drops below the transportation cost, businesses would need some payment from local governments to maintain profitability.

Advantages:

As with citizens' groups, private businesses would take the responsibility of researching markets and administering transportation.

Disadvantages:

Even if agreements are made with businesses, at least one component of the recycling program would be dependent on the actions of a private business. If the business is unable to meet its obligations, the entire recycling program would be at risk.

Option 4C: County Governments

Physical Description:

As an alternative to private businesses or volunteer groups, the County could process and transport the recyclable materials itself. Recyclable materials would be collected at a central location, baled (if necessary), and shipped to a purchasing industry or recycling center. The central site could be developed at the landfill or transfer station. If the county has chosen to use a transfer station, many of the facilities needed for processing and loading recyclables will already be in place.

The County would hire staff to operate the central site, as well as staff to monitor the recycling market and negotiate contracts.

Cost Analysis:

The costs associated with this option are extremely variable. Much depends on the market value of recyclable materials, the distance to those markets, and transportation costs.

Advantages:

By marketing recyclable materials itself the County maximizes its control over the process. As a municipality (or group of municipalities) the county(ies) may be able to negotiate long term contracts with buyers that would not be available to other groups.

Disadvantage:

The greatest disadvantage to this option is the additional administrative burden on small county staffs. The county would be responsible for constant market research, and for significant capital investment in the construction of a central site.

Long Term Plan

Strategies developed in this plan have been created taking into account long and short term needs of the region. The localities, faced with meeting mandates at a prescribed date, find themselves in a position of having little data available upon which to base their decision making process. Long term capital investments need to be made carefully. Therefore the next year will be used to develop waste reduction strategies, while maintaining the existing systems. Over the period of the next twelve months the existing waste management system will be evaluated and decisions for the future will be made by local governments. The long term plan, as it takes shape, will combine the effective components of the existing system with new initiatives to meet the region solid waste management goals.

In addition to the physical components of the system outlined above, the localities of the Northern Neck may choose such regulatory options as mandatory recycling, tipping fees, and

restrictions on materials accepted at landfills.

The future plan will also allow for flexibility. The system will be evaluated periodically and adjusted to meet the needs of changing waste stream characteristics, recycling markets and public participation.

Notes

1. Cost estimates provided by the Northern Neck Recycling Task Force, and the Northern Neck Planning District Commission.
2. Ibid.
3. Ibid.
4. Ibid.
5. Ibid.
6. Ibid.
7. CH2M Hill. Economic Evaluation of Landfill Alternatives, Prepared for Lancaster, Northumberland, Richmond and Westmoreland Counties. 1990. pp. 5-10, 5-11.
8. CH2M Hill. Draft Report: Evaluation of Local Versus Distant Disposal, Prepared for Lancaster, Northumberland, Richmond, and Westmoreland Counties. February 1990. p. 5-2.

Section IX

Special Waste

Special Waste

Because of their unique nature, certain types of waste have been considered separately from the rest of the waste stream. Many of these require special handling or offer other challenges and opportunities for disposal not shared by general municipal waste.

Sewage Treatment Plant Sludge

Existing Situation:

There are currently four municipal sewage treatment plants on the Northern Neck that produce sludge.

Reedville- The sewage treatment plant at Reedville presently produces an average of three thousand (3000) pounds of dewatered sludge per year. This is disposed of in the Tri-County Landfill at Lara. The plant is operating at fifteen percent (15%) of its design capacity.¹ If the service area were expanded to utilize some of the excess capacity the amount of sludge produced would also increase.

Kilmarnock- The Kilmarnock Sewage Treatment Plant currently trucks sixteen thousand (16,000) gallons of sludge to local sewage lagoons for additional treatment. The plant is presently running at seventy percent (70%) of capacity.²

Warsaw - The Town of Warsaw has recently negotiated with the Westmoreland County landfill to accept their first de-watered sludge. The Town is anticipating approximately one dump truck load per year.³

Colonial Beach - The Town of Colonial Beach currently takes its dewatered sludge to the Westmoreland County landfill. The Town sewage treatment plant has been plagued recently with problems related to groundwater infiltration into lines and compliance with State discharge regulations. In order to address these problems the Town is proposing the construction of a state of the art "Lemna" treatment system. If the system is constructed it will eliminate the need for sludge disposal for 15 years. At that time the Lemna pond may require cleaning.⁴

Plan:

The localities of the Northern Neck plan to promote land application of sewage treatment plant sludge. Though the volume

Table 9.3: Richmond County

**Projections of Certain "Special Wastes" in Waste Stream
(Tons/Year)**

	1990	1995	2000	2005	2010
Major Appliances	91	94	99	98	97
Furniture	241	259	300	341	383
Automotive Batteries	54	59	66	73	81
Tires	61	59	63	66	69
Total	447	471	528	578	630

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Table 9.4: Westmoreland County

**Projections of Certain "Special Wastes" in Waste Stream
(Tons/Year)**

	1990	1995	2000	2005	2010
Major Appliances	193	197	203	198	192
Furniture	513	542	616	689	763
Automotive Batteries	114	123	135	148	161
Tires	129	123	129	133	136
Total	949	985	1,083	1,168	1,252

Source: "Characteristics of Municipal Solid Waste in the United States: 1990 Update", U.S. E.P.A., 1990
Northern Neck Planning District Commission

Notes

1. Reedville Sanitary District Staff.
2. Town of Kilmarnock Staff.
3. Town of Warsaw Staff.
4. Town of Colonial Beach Staff.
5. Virginia Water Project, Inc. Water for Tomorrow. 1988. pp. 89-130.
6. Virginia Department of Agriculture. Farmers Clean Day in Virginia. 1991.
7. Telephone conversations with local businesses.
8. Northern Neck Planning District Commission. [Business Recycling Survey]. Unpublished raw data. 1991.
9. Westmoreland County Cooperative Extension. [Compost and Mulch Survey]. Unpublished raw data. 1990.
10. Virginia Department of Waste Management Staff.

Section X

Education

EDUCATIONAL GOALS

To increase the available information and public awareness of:

- a. the importance of recycling and waste management;
- b. types of recyclable and non-recyclable materials;
- c. various methods to reduce waste: resource recovery, source reduction, recycling, and landfilling;
- d. the importance of each individual's participation in reducing waste;
- e. the environmental impacts of improper waste management;
- f. how to participate in local recycling programs;

WHY RECYCLING EDUCATION IS IMPORTANT

Many citizens and businesses are willing to participate in a recycling program but also have many questions that need to be answered such as what can be recycled, can different types of materials be mixed, how should the materials be stored, etc. Educational programs will help answer these questions by providing information and guidelines to the public while also helping the public understand the importance of the problem, gain community support, and increase awareness.

There is a need to demonstrate to the public that there is a solid waste management problem. By supplying information about the life of the landfill, the amount that waste would be reduced if there was a recycling program, an explanation of the costs involved, and the environmental impacts, the general public would be able to make educated decisions about waste management in their community, workplace, and home.

Getting citizens to participate in a voluntary recycling program requires education (informing people of what needs to be done and the reasons behind these actions) and promotion (keeping the public aware of the program and how it is progressing). Many approaches can be taken to educate and inform the public about recycling and solid waste management issues:

- ads in local newspapers or the free "shoppers" that are available
- public service announcements on local radio stations
- news releases for the local media
- notices and bulletins sent to community service groups
- short presentations or speaking engagements to local civic groups
- free information at local governmental offices
- incorporation of waste management and recycling activities in the schools

All of the approaches listed above should be used to keep the public informed about solid waste management and recycling in their communities.

Our goal is to help citizens of the Northern Neck to understand their role in decreasing the amount of solid waste through dissemination of information. An educated public will be

able to make informed choices about how to help solve the waste management problems in their community.

EDUCATIONAL ACTIVITIES IN OTHER AREAS

Human Resources Division, VPI&SU

The Virginia Tech Cooperative Extension Service is very involved with recycling efforts and educating the public about waste management statewide. The extension agency has developed many informative publications about recycling and solid waste management including an educational brochure for the New River Valley area. They have also developed a "packaged" training program for civic clubs and provided training sessions for local volunteer groups. They are working with the Virginia Department of Waste Management to promote recycling and solid waste management education. The extension service would like to have the local extension agency staffs provide assistance with recycling and solid waste management education in their given areas, if time permits¹.

The Virginia Cooperative Extension Office will launch an intensive training program for local officials in the Fall of 1991. Solid waste technologies and decision making processes will be addressed during the two day workshops which will be held at four locations across the state. The session most convenient for Northern Neck officials will be in Richmond. An outline for the program should be available in July. Northern Neck officials who will be involved with solid waste management will be urged to attend.

Curriculums and Lesson Guides

Recycling Study Guide-Wisconsin Department of Natural Resources

This study guide from the Department of Natural Resources is an excellent resource for ideas about incorporating the topics of recycling and solid waste management into all disciplines. The guide is intended to help teachers and students understand what solid waste is, where it comes from, and what can be done about the problem of managing it. The study guide includes an overview of solid waste management and recycling, a glossary, class activities, and a list of other resources for educational use. The activities in the guide are designed for use in grades 4-12 and should be useful at other grade levels with slight modification².

"Here Today, Here Tomorrow" and "Here Today, Here Tomorrow-Revisited, A Teachers Guide to Solid Waste Management" from the Division of Solid Waste Management of the New Jersey Department of Environmental Protection is another excellent guide for educators interested in solid waste and recycling. The program has been widely distributed throughout New Jersey and could be used as a basis for class activities in the Northern Neck Region. The program was originally designed to draw attention to the problem of waste management. The overall goals of the guide are:

1. to help students acquire an awareness that a problem exists in the management of solid waste;
2. to help students realize they share a part of the solid waste problem;
3. to help students acquire a basic understanding of the four prong approach to solid waste management;
4. to provide students an opportunity to prioritize options in solving the solid waste problem; and
5. to encourage students to identify and implement specific actions consistent with the four prong approach to solve the local solid waste problem.

The activities in the guide are structured with singular objectives. They include suggested subject areas, skill identification, materials needed, a detailed procedure, and possibilities for including local waste management procedures. The guide includes a glossary page that can be copied for distribution to students, and a list of resources and references³.

Lunenburg County

The County has had a litter program since 1983. The key to the recycling program was forming an educational committee consisting of teachers and school board members.

The County has used Operation Wastewatch and The Three R's from the Virginia Department of Waste Management and found it to be very good for science and ecology clubs, 4H clubs, science and civics classes. Special events in school and throughout the community were used to spur interest in recycling. Trash art contests, clean room contests, a litter critter mascot, and 4H recycling contests. Local businesses provided sponsorship and prizes for the contests. Adopt a highway and adopt a spot programs were initiated throughout the county and maintained by students, civic organizations and local businesses. Promotional

material from governmental agencies and in-house material was used, the litter control office sets up display at the opening meeting for teachers in the fall to make sure they know what resources are available for use when teaching about recycling and waste management⁴.

EDUCATIONAL PROGRAMS IN THE NORTHERN NECK

VOLUNTEER GROUPS

The Northern Neck Recycling Task Force has been active since the Fall of 1990. In March, the Task Force volunteers prepared a general education mailing to 1,000 households. The Task Force also organized the Earth Day celebration that focused on recycling and its impact on the environment. One of the goals of the Task Force is to "educate individual citizens, businesses and civic groups in their roles and responsibilities in recycling techniques and waste management." Objectives under this goal include:

1. Conduct active, public awareness programs in newspaper, radio, churches and other organizational newsletters and bulletins.
2. Enlist public participation in recycling programs including volunteer collection and membership.
3. Encourage and support educational activities in all local schools.
4. Serve as information resource on recycling and solid waste management through creation of a speakers bureau, conducting workshops and seminars.
5. Develop citizen outreach program to raise awareness throughout the Northern Neck.
6. Inform and encourage local businesses to establish recycling programs at the commercial level and to establish employee participation programs⁵.

The Westmoreland War on Waste (WWOW) is a non-profit organization made up of local citizens. Each year WWOW tries to alert the County citizens of new laws and regulations on litter and recycling, and the better way of life that recycling and litter clean up creates. In 1990-91, WWOW conducted programs to inform the public about recycling at area schools. Through their art work, essays, and logo contests, the youth learned to

appreciate their surroundings and to become aware of the difference they can make toward the recycling effort.

WWOW also furthered their reach of citizens by working with local newspapers, area cable company, and area civic groups. Representatives of WWOW presented articles, and gave talks on the problems of litter⁶.

EXTENSION OFFICES

When requested, the Northumberland County Cooperative Extension Service has done various one time projects with the local citizen groups such as the Womans Club and the Ruritan Club.

The Service is working with the fourth and fifth grade 4H chapters in the Northumberland County schools. Recycling has been discussed. They are not currently working with the schools.

The Service sponsored a cleanup day for local farmers in 1990 (see section xx). The cleanup was funded by a grant from the State. Farmers were allowed to bring in old pesticides and containers that were considered to be hazardous waste and therefor not landfillable. The Extension Office would like to have a cleanup day for homeowners to dispose of leftover paints, sealants, cleaning fluids, and other waste that should not be landfilled. Funds would be needed before this could take place again.

The current publicity taking place includes monthly media releases, flyers, newspaper, a weekly radio broadcast, and the extension service newsletter⁷.

The Westmoreland County Cooperative Extension Service office has been working with the Westmoreland War on Waste to promote and collect recyclables. Extension agents have been making speeches and presenting programs for the schools. Interest in recycling has increased over the years. About two years ago there was little public response to a recycling promotion and survey initiated by the Extension Service. Presently, the Extension Service assists with recycling days in the county and helps schools and clubs collect aluminum cans as class projects and fund raising efforts. The Extension Service Office also makes available to the public video tapes, brochures and other materials from the Department of Waste Management⁸.

The extension offices in Lancaster County and Richmond County are depending on Litter Control Agents and local volunteer groups to inform the public about recycling and solid waste management.

SCHOOL PROGRAMS

In order to determine what education has taken place in the region the schools were contacted and information gathered from superintendents, principals, and teachers. Most of the information was obtained through phone interviews and some from personal meetings. Many of the teachers are interested in having recycling and solid waste management material available for use as ideas for class activities and projects. Presently, recycling and waste management are being discussed at all grade levels in the Northern Neck.

Lancaster County Schools have acquired a grant from the National Audobon Society to fund some environmental education and purchase materials for classroom activities.

There is an active Ecology Club in the High School, they also offer an ecology class as an elective⁹.

At Lancaster Primary School some of the teachers have attended environmental education training camps in Connecticut and Maine which were sponsored by the National Audobon Society. These camps helped the teachers design activities appropriate for their classes and provided ideas for special school events.

Teachers demonstrated to the students the importance of plants in the ecological system. Trees supplied by the National Audobon Society were planted on the school grounds with the assistance of the County Forester. Some teachers have brought indoor plants for the classroom to "clean" the air and give the students an opportunity to care for, and gain an appreciation of, plantlife.

Discussions about endangered species and what can be done to help save them have been popular with the students. The third grade has adopted a manta ray and a whale through the Audobon's Florida Chapter to give students the opportunity to learn about endangered species.

Various classes had discussions about water ecology and the Chesapeake Bay and how these are affected by pollution. The school has had field trips to the Watermans Museum and to the Virginia Institute of Marine Science. Guest speakers such as the County Forester and the local Game Warden came to the school to

talk about wildlife, soils, and plantlife.

There is a Litter Patrol formed by a group of teachers, who pick up litter on the school grounds once a month. The teachers have designed buttons to promote the Litter Patrol and increase the students awareness of the problem.

Posters have been placed in the school promoting recycling. Teachers have also placed information about recycling and waste management on bulletin boards in classrooms to help promote awareness.

Classes have been collecting aluminum and newspapers for recycling. This activity has been successful, but a lack of storage space has been a problem.

Some classes have completed a unit about energy conservation where students learned about the generation of electricity, hydroelectric dams, and nuclear energy. Students were taught to conserve natural resources by conserving energy. This unit demonstrated how recycling can save energy and natural resources¹⁰.

Chesapeake Academy, a private school in Lancaster County, has been encouraging recycling and teaching waste management issues for a number of years. These issues are taught as part of science and humanities classes at the school. The Headmaster feels that waste management should not be taught just as a unit but integrated throughout all classes and be promoted the entire year¹¹.

Northumberland County High School has not done any recycling at the school but waste management and recycling are being taught in the earth science and biology classes. The students have worked with local civic groups on recycling projects that have taken place in the past¹².

Callao Elementary School had a poster contest to promote the idea of recycling and increase the students and parents interest. The students have participated in cleanup projects and planted trees on Earth Day. There is a great deal of interest from the students. It has been difficult to do recycling projects at the school because of storage problems and the inconvenience of recycling centers¹³.

At **Fairfields Elementary School** all of the students attended the Theater IV production of "Its a Wonderful World" which featured conservation and recycling. There were class discussions before and after the play about environmental issues.

Teachers have had discussions with classes about earth day--what the students could do and why Earth Day is important.

Weekly Reader issues featuring the environment in several classes served as a basis for class projects and activities. The articles "Too Much Trash", "Trash-Where Does It Come From? Where Does It Go?", and "Recycling" were used as a basis for lessons about solid waste management and recycling.

Social Studies class had a recycling unit using the weekly readers, a large bulletin board featuring facts about waste management and an explanation of the Reuse/Reduce/Recycle process¹⁴.

Richmond County Elementary School has had workshops for grades K-5 which explained the value of recycling, what it is, how to recycle materials, and problems associated with solid waste management.

Films about environmental issues and recycling are available for the teachers to show in their classes. The topic of recycling is discussed in the classes but is not a part of the curriculum. Special events at the school have been used to publicize recycling and waste management. All grade levels were involved in poster contests to promote recycling and increase awareness of solid waste management problems.

The **Richmond County Intermediate School** has also taken part in many special events concerning recycling. All classes participated in a anti-litter and recycling slogan contest which was held this year.

All of the science classes have been stressing the importance of recycling and the importance of solid waste management to the students.

The 7th grade has been collecting aluminum drink cans at lunch in the cafeteria and turned it into a science project.

The **Richmond County High School** science club has been collecting cans and utilizing the local recycling facility¹⁵.

Woodland Academy, a private school in Westmoreland County, has been collecting and recycling newspapers for a couple of years. These materials have been collected by the student government and recycled. Storage and transportation of these materials has been a problem.

Most of what is taught about recycling and solid waste management comes from textbooks in the science classes. The students are interested in recycling and waste management issues. The instructors would like to have more environmental education geared toward local issues and the Chesapeake Bay area for use in the classes.

The school is currently seeking funds through grants for materials and class projects¹⁶.

At the Cople District Elementary School, videos about solid waste management and recycling have been shown in the 4th and 5th grades. The 5th grade teaches a unit about recycling and waste management.

The school has not been collecting recyclable material but collection will begin in the Fall of 1991 with the assistance of a County Extension Agent¹⁷.

The Montross Elementary School PTA has worked with the schools to collect aluminum cans throughout the schools. Many classes have seen the environmental videos that are available from the County Extension Office. The County Extension Agent has spoken to the students and the PTA about recycling and what can be done in their communities¹⁸.

The A.T. Johnson Middle School is collecting aluminum cans that students bring from home, but this was not heavily publicized at the time this plan was written. This will be promoted more in the Fall of 1991 with posters and flyers at school.

The school had a Earthday celebration, along with class discussions and projects, to promote environmental issues.

Recycling and solid waste management are being promoted in classes where the topic is applicable¹⁹.

At Washington and Lee High School waste management and recycling are being taught in all science classes, including biology, chemistry, physics, and marine science. Physics and

chemistry students have been able to earn some extra credit by participating in a home recycling program. This program has been very successful at collecting newspaper, glass and aluminum from approximately 30-40 households. The recycling activities have been taking place with cooperation from the Westmoreland War on Waste and the PTA in Westmoreland County.

The Science Club has done highway cleanups and sponsored cleanups for areas in the county. The club has bought containers for the cafeteria and gym for use by the students in an attempt to solve the ongoing storage problem. The high school would like to consolidate their efforts with the middle and elementary schools in order to make the recycling process more convenient for all who are involved²⁰.

LOCAL GOVERNMENT PROGRAMS

Towns of the Region need to expand their roles in the educational process. Efforts by the towns to publicize recycling in the Northern Neck have been hampered by limited budgets and small staffs.

The Town of Kilmarnock has been very active in encouraging support for the recycling efforts of the Northern Neck Recycling Task Force. The Town was active in obtaining ordinances for the NNRTF to collect recyclables, and encouraged property owners to allow the NNRTF to use the property. Kilmarnock has supported the annual Spring Clean to increase awareness of recycling in the area²¹.

The Town of Warsaw has placed ads in the local paper, ads for recycling days on the local radio stations, and posted flyers at local businesses.

The Town has had difficulty convincing the public that it is necessary to recycle and reduce wastes. The Town feels that if the public wasn't being paid for materials they would not be doing it²².

COUNTIES

Lancaster County Litter Control Office does not have an educational program at this time and is depending on the Northern Neck Recycling Task Force to publicize recycling. The County Litter Control Committee was inactive at the time this plan was written²³.

The Richmond County Litter Control Office sponsored a county clean up week in April 1991 to increase awareness about solid waste management and recycling. The office has assisted with litter clean up projects with local civics groups and also sponsored poster contests in schools for a recycling and anti-litter slogan contest.

To date, informational material has consisted of distributing pamphlets from Department of Waste Management and the Environmental Defense Fund and other environmental groups and a series of four articles in the Northern Neck News concerning recycling.

The litter control office aired ads on the local radio stations, WRAR and WNNT. The litter control office is attempting to establish a monthly recycling day for Richmond County²⁴.

PROMOTING EDUCATION

Education about waste management and recycling has been very limited in the Northern Neck. There is a need to expand this education in order to inform all citizens, businesses, and local government officials about these processes. The dissemination of information concerning recycling, source reduction, composting, landfilling, and material collection in the Northern Neck must increase if the solid waste management plan is expected to be successful.

Recycling is a major element of any waste management plan. It reduces the use of natural resources and energy and conserves landfill space. Source reduction must be initiated by manufacturers to be effective. This process could be initiated at a local level if Northern Neck Consumers made a conscious effort to purchase goods without excess packaging. Although many people in the region already have composting operations for farms, landscaping and backyard gardens, education on this topic needs to reach everyone in the Northern Neck. Our citizens need information about materials that can and can't be landfilled in order to maintain safety and efficiency at these disposal sites. There is a need for dissemination of information concerning local collection processes. Citizens and businesses need to understand the collection procedure for their area. Information needs to be made available to everyone describing materials that will be collected, collection times, and the cost for this service.

The main goal of educating the citizens of the region is to supply the background information to determine good and bad waste management procedures and to provide the "how to" for recycling. Many citizens and businesses throughout our community are willing to recycle but find it is either too inconvenient or they don't have enough knowledge about the types of recyclable materials.

An extensive public awareness campaign could be used to stimulate and maintain participation in recycling. This campaign could include widely available informational materials, mass media support, educational support, educational workshops, a speakers bureau, and public events to spur recycling participation. Special events and contests will be used in the schools and throughout the county to raise the awareness level of the public.

The Task Force has been recycling since the Fall of 1990 and has knowledge concerning problems that will be encountered when new programs are initiated. We will use Northern Neck Recycling Task Force's past experiences as a guide for what needs to be explained to the public and the most effective way to distribute information to citizens. Two projects the Task Force will be concentrating on will be the establishment of a speakers bureau

and the creation of a briefing team to conduct educational seminars workshops at churches, civic associations and clubs.

Local civic groups will be encouraged to hold special events such as clean up days and contests for their localities. These events could be focused toward businesses and the general public to increase awareness of the waste management problems and make recycling more convenient.

Educational literature will be available throughout the region. Pamphlets and other materials will be made available at the county offices, the PDC office, county extension offices, recycling centers and at the landfill for the public. Brochures explaining the localities policies, regulations, and attitudes toward landfiling and recycling, along with guidelines for these processes, would be most important.

Bulletin boards containing specific information about collection and disposal processes will be placed at recycling centers and the landfill. These will serve as a convenient and effective method for disseminating information to the public.

Training of local civic organizations and volunteer groups should be accomplished through workshops held by state agencies and the extension offices. These organizations could play a major role in disseminating information to the general public and helping to maintain interest in recycling. A central group/coordinator for local training will also be investigated.

The region's local officials will be encouraged to attend the statewide workshops that will be offered by the Virginia Cooperative Extension Service in the Fall of 1991. These workshops would provide a background for county officials and help them make more informed decisions about waste management.

A volunteers' speakers bureau will be organized utilizing the Northern Neck Recycling Task Force, Westmoreland War on Waste, county extension agents, county litter control agents and others to educate civic groups and businesses about recycling. This group would also speak to classes at the local schools about recycling and solid waste management.

SCHOOL PROGRAMS

The young people in our community play an important role in solving the solid waste management problems of today and tomorrow. Educators can help students understand their role in solving waste management problems. Teachers can help students become aware of the solid waste problems the world is facing, learn to respect the environment, and develop a positive attitude toward recycling.

The Planning District Commission realizes that a portion of the schoolday is already taken up by extracurricular activities and teachers need as much time as possible for teaching basic subjects. For this reason, we suggest that the schools use inter-disciplinary activities that can be incorporated into a wide range of classes and would not take time away from normal classroom work. Activities such as math problems using recycling data, stories about environmental issues, science experiments that deal with solid waste disposal and many other excises could be used.

The Planning District Commission encourages the use of information and activities which are currently available from a variety of sources. The Environmental Protection Agency (EPA), Virginia Department of Waste Management (VDWM) and many other agencies and organizations throughout the country have developed curriculums, study guides and reference materials about waste management and recycling. We would like to see recycling and solid waste management education incorporated into all subjects in order to increase students awareness of the problem. We would recommend the use of the EPA's "Recycle Today!" program consisting of publications focusing on the importance of recycling. "Lets Recycle" presents lessons and activities divided into units for grades K-12 about solid waste generation. Each unit presents a series of related lessons with vocabulary words, discussion questions, and projects. Teaching aids are also included along with a glossary and bibliography of additional sources of information.

The Virginia Department of Waste Management curriculum covers such issues as the importance of recycling, the value of natural resources and the responsibility each person bears for minimizing the generation of solid waste. The curriculum also provides avenues to incorporate information about the local community into the activities.

Operation Waste Watch has been available from the Department of Waste Management since the early eighties and provide teaching materials for environmental education. The New Three R's: Reduce, Reuse, and Recycle, from the Department of Waste Management has lessons and projects for secondary school students. These lessons tend to focus on science and social studies but could be used to develop lessons in any course. The technologies of solid waste management, packaging, shopping, composting and a simulation of a local waste management problem are included.

Skills that can be taught in the curriculums cited above include creative writing, vocabulary, debating, library skills, science and math skills, problem-solving, measurements, arts and crafts, social studies, community service, and environmental awareness.

Many educational materials have been developed by other states and localities in addition to what the Virginia Department of Waste Management has done. In order to minimize program development costs we suggest that teachers also consider using lesson plans and materials from other states, environmental agencies and conservation groups. These will give teachers even more options to choose from. It will be easier for teachers to introduce recycling and waste management to their classes if lesson plans, resource materials, and ideas for practical projects are provided. From there, the teachers may wish to modify these lessons or create new ones of their own.

We would like for the counties to encourage ecology clubs in the schools. These clubs could provide an effective method for disseminating information in the schools and provide a catalyst for greater student involvement in the future.

The formation of an educational committee consisting of litter control agent, teachers, students, and local businessmen could bring together all of the recycling efforts now taking place at schools throughout each county. An educational committee was the key to the successful recycling program developed in Lunenburg County. This group could plan and sponsor activities for the schools, select class projects, and design curriculums that would work best in each individual school. A cooperative effort put forth by the educational committee would make an impact on the entire region and serve as an example for others to follow.

LOCAL GOVERNMENTS

Education and technical assistance by all levels of government can help improve waste management in our area. There is a need for a system to disseminate information to the general public about waste management and recycling in the Northern Neck. The Planning District Commission office and extension agent offices, along with the county and town offices will become clearing houses for information about solid waste management practices in our area. This goes back to the point that a waste management plan will be more successful if the citizens are well informed. Materials available at these offices should include pamphlets and brochures for the general public about local waste management, explanations of waste management and recycling procedures in that particular town or county, where to take recyclables, and what type of materials are recyclable. If the necessary information is not available at these offices, someone will be able to direct the person to an agency that does have it.

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